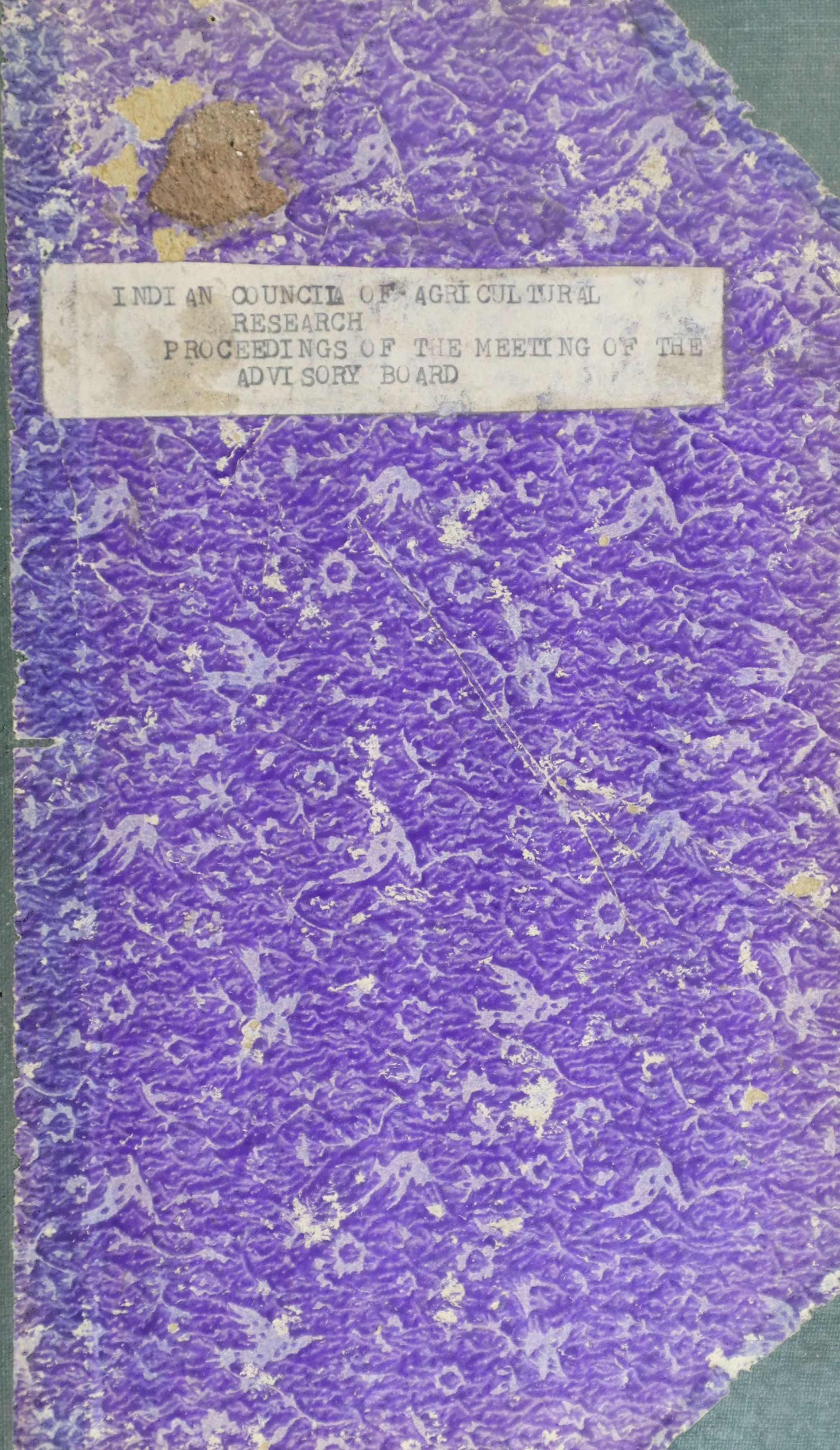

INDIAN COUNCIL OF AGRICULTURAL
RESEARCH
PROCEEDINGS OF THE MEETING OF THE
ADVISORY BOARD

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

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PROCEEDINGS OF THE MEETING
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HELD AT NEW DELHI
FROM 22ND TO 24TH NOVEMBER 1956.

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

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PROCEEDINGS OF THE MEETINGS OF THE ADVISORY BOARD HELD AT NEW DELHI FROM 22ND TO 24TH NOVEMBER 1956

AGENDA

A. GENERAL

A.1. Action taken on the general recommendations made by the Board of Research and the Advisory Board at their meetings held in January, 1956.

A.2. General Recommendations made by the Scientific and Commodity Committees at their meetings held in April and October, 1956.

A.3. Observations made by the Scientific and Commodity Committees at their meetings held in October, 1956 on the new schemes and proposals for the continuance of current schemes listed under Sections B to Y with the remarks of the Boards of Research and Extension thereon.

A.4. Preparation of a priority list in respect of new schemes recommended for sanction.

A.5. Notes on policy matters suggested by the members of the Advisory Board.

A.6. Review notes by the Boards of Research and Extension on the various agricultural and animal husbandry subjects *i.e.* on

(1) Problems on which research work has been completed and the results thereof can be passed on to Extension Workers for general adoption,

(2) Problems on which research work is already in progress but requires intensification, and

(3) New problems on which research should be initiated.

A.7. Notes on policy matters pertaining to agricultural and animal husbandry research and extension work prepared by the Boards of Research and Extension.

A.8. Control and treatment of Surra and bovines and equines, New scheme, Madras.

A.8. (A) EXPLOITATION OF INVENTIONS BY THE NATIONAL RESEARCH DEVELOPMENT CORPORATION—GENERAL AGREEMENT WITH THE GOVERNMENT FOR APPOINTMENT OF PREMIA AND EXPLOITATION OF PATENTS.

A. 8(B) CO-ORDINATION OF RESEARCH ON ANIMAL HUSBANDRY, APPOINTMENT OF STAFF FOR SCRUTINIZING REPORTS, PROGRAMMES, ETC., FROM STATE GOVERNMENT, COMMODITY COMMITTEES, CENTRAL INSTITUTIONS, ETC.

A.9. Details of sanctions accorded by the Standing Finance Committee and the Governing Body at their meetings held in Februray 1956.

A.10. Constitution of a Floriculture Committee under the Council.

A. 11. Constitution of an Apiculture Committee as a reg
Scientific Committee under the Council.

A.12. *Deleted.*

A.13. Appointment of Additional members on certain Scien
Committees of the Council.

A.14. Reconstitution of the Regional Committees.

A.15. Comparison of the value of research fellowships.

A.16. Proposal to appoint Project Co-ordinators for co-ordina
schemes sponsored by the Council.

B. BOTANY AND PHYSIOLOGY

B 1.	Blast resistant varieties of paddy	New Scheme	West Bengal.
B. 2.	Induction & Study of ampliploidy in rice.	New Scheme	West Bengal.
B. 3.	Drought resistant paddy	New Scheme	West Bengal.
B. 4.	Hill paddy improvement	New Scheme	Uttar Pradesh.
B. 5.	Late paddy improvement	New Scheme	Uttar Pradesh.
B. 6.	Deep water paddy	New Scheme	Uttar Pradesh.
B. 7.	Dry land paddy and Boro paddy	New Scheme	Uttar Pradesh.
B. 9.	Cytological studies on maize	New Scheme	Andhra University.
B. 10.	Drought resistance in wheat	New Scheme	Madhya Pradesh.
B. 11.	Breeding rust resistant varieties of wheat.	New Scheme	West Bengal.
B. 12.	Super drought resistant jowar evolution and exploitation of hybrid vigour in jowar.	New Scheme	Madras.
B. 13.	Multiplication and distribution of hybrid sajja (bajara).	New Scheme	Andhra.
B. 14.	Genetic studies on sorghum	New Scheme	I.P.I., Indore.
B. 15.	Coordinated millet scheme	New Scheme	I.C.A.R.
B. 16.	Pulse research scheme	New Scheme	Assam.
B. 17.	Improvement of pulses	New Scheme	Andhra.
B. 18.	Improvement of Indian pulses of high nutritive quality and nitrogen fixing capacity at Coimbatore & Aduthurai.	New Scheme	Madras.
B. 19.	Investigation on cytogenetics and morphogenesis of nodules of some common Indian leguminous crops.	New Scheme	West Bengal.
B. 20.	Physiology of flowering in tropics	Extension	Calcutta University.
B. 21.	Breeding and evolution of rice strains resistant to piricularia disease and work on spring rice in flooded areas of Collair.	Extension.	Andhra.

B. 22.	Storage and viability of pollen grains and physiology of pollen tube growth.	Extension	Delhi University.
B. 23.	Wheat rust control scheme	Extension	Uttar Pradesh.
B. 24.	Multiplication and distribution of hybrid bajra (Cumbu) seeds.	Extension	Madras.
B 25.	Co-ordinated maize breeding scheme proposal for amendments.	Note	Madras
B. 26.	Additional staff for non-lodging, non-shedding and flood resistant varieties of paddy, Madhya Pradesh.	Note.	I.C.A.R.
B. 27.	Report of the Sub-Committee of the Botany Committee on the Collection and maintenance of varieties and types of millets grown in India.		I.C.A.R.
B. 28.	Proceedings of the Wheat Research Workers' Conference and Crops and Soils Wing meeting held at Simla.		I.C.A.R.

C. AGRONOMY

C. 1.	Survey and improvement of fodder crops.	New Scheme	I.P.I., Indore.
C. 2.	Scheme for cytogenetics of the wild grasses and breeding them for selection of fodder, and forage grasses.	New Scheme	Madras.
C. 4.	Study of the effect of important agronomical practices on Jowar.	New Scheme	I.P.I., Indore.
C. 8.	Water relations of crops	New Scheme	West Bengal
C. 9.	Water requirements of crops	New Scheme	Andhra.
C. 10.	Water requirements of crops	New Scheme	Agra College.
C. 11.	Green Manure	New Scheme	Uttar Pradesh.
C. 12.	Nature and extent of intake of different forms of phosphates by leguminous green manure crops.	New Scheme	Madras.
C. 13.	Sprinkler Irrigation	New Scheme	Madras.
C. 14.	Sprinkler Irrigation	New Scheme	West Bengal.
C. 16.	Study of weeds of crops fields of Eastern parts of India.	New Scheme	West Bengal.
C. 17	Weed Control	New Scheme	West Bengal.
C. 18.	Weed Control	New Scheme	I.P.I., Indore.
C. 19.	Hydroponic Experiments	New Scheme	Uttar Pradesh.
C. 25.	Phenological observations	Extension	Meteorological Department.
C. 27.	Manufacture of weedcides at National Chemical laboratory.	Note	I.C.A.R.
C. 28	Cultural studies with upland Aus Paddy	New Scheme	West Bengal.

D. SOIL SCIENCE

D. 1.	Use of Carbons in reclamation of soils	New Scheme	Punjab University.
D. 2.	Standardisation of methods for determination of (i) Surface areas and (ii) PH values.	New Scheme	Punjab University.
D. 3.	Scheme for research on deminerlisation of water.	New Scheme	Punjab University.
D. 4.	Fixation of phosphorus and potash .	New Scheme	Punjab.
D. 5.	Fertility index and prediction of crop production.	New Scheme	Bombay (Dr. A. N. Puri).
D. 6.	Investigations on Kallar lands . .	New Scheme	Bombay.
D. 7.	Chemical tissue tests and leaf analysis	New Scheme	Andhra.
D. 9.	Micronutrient element in the physiology of crop plant with the help of radioactive tracers.	New Scheme	West Bengal.
D. 10.	Survey of antibiotic producing micro-organisms from the soils of India.	New Scheme	West Bengal. (Bose Insutitute)
D. 11.	Reclamation of saline soils . .	New Scheme	West Bengal.
D. 12	Soil plant inter-relationship with respect to up take of minor elements.	New Scheme	West Bengal.
D. 13.	Biological approach for the reclamation of soils.	New Scheme	Madras.
D. 14.	Foliar application of nutrients to crops.	New Scheme	I.A.R.I.
D. 15.	Soil structure studies . . .	New Scheme	Punjab.
D. 16.	Study of organic matter of major soils types with reference to clay humus complexes and chelate compounds.	New Scheme	Banaras Hindu University.
D. 17.	Research on Micro and Micro-Nutrient element studies in Usar Lands.	New Scheme	Lucknow University.
D. 18.	Nitrogen fixation of leguminous crops	New Scheme	Madras.
D. 21.	Chemical investigations of the cause of blast resistant in paddy.	New Scheme	Madras.
D. 25.	Study of the rate of decomposition of insecticidal deposits.	New Scheme	Osmania University and Uttar Pradesh.
D.25.B.	Studies of nutritive value of different varieties of wheat and study of physiological condition.	New Scheme	M.G.M. College, Indore
D.25.C.	Investigation on the nutritive value of Common and hybrid Indian Wheats.	New Scheme	I.A.R.I.
D.25.D.	Salinity and Alkalinity control in Punjab.	New Scheme	I.A.R.I.
D. 26.	Humification of organic matter .	Extension	Agra College.
D. 27.	Soil Analysis Standardisation . .	Extension	Bombay (Dr. A. N. Puri).
D. 28.	Ammonium Sulphate to paddy lands .	Extension	West Bengal.

D. 29.	Micro-nutrient status of Bombay Soils	Extension	Bombay.
D. 36.	Biological nitrogen fixation under different Indian conditions with particular reference to its importance in practical agriculture.	Note.	Dr. M. R. Madhok, State Bio-chemist Punjab.

E. FLORICULTURE

E. 1.	Cytogenetical & Physiological studies in relation to Floriculture.	New Scheme	I.A.R.I.
E. 2.	Cultivation of Lotus	New Scheme	Uttar Pradesh.
E. 3.	Multiplication of annual flower seeds	New Scheme	Uttar Pradesh.
E. 4.	Research and development of Floriculture.	New Scheme	Pepsu/Punjab.

F. FRUITS

F. 1.	Research on Cashewnut	New Scheme	West Bengal.
F. 2.	Banana Research Station	New Scheme	Andhra.
F. 3.	Cytogenetical studies on grapes and wild spices.	New Scheme	Madras.
F. 5.	Improvement of pineapple by application of growth regulating substances.	New Scheme	Gauhati University.
F. 6.	Investigation of root rot, limbs breakage and deficiency diseases of citrus.	New Scheme	Andhra.
F. 7.	Training in Fruit preservation	New Scheme	Andhra.
F. 9.	Collection of Banana varieties	New Scheme	Madras.
F. 10.	Controlling of fruit diseases in Aurangabad.	New Scheme	Hyderabad.
F. 11.	Enzymic process in the germination of mango seeds.	New Scheme	Lucknow University.
F. 12.	Assessment of variability in Horticultural material with a view to reduce it.	New Scheme	Coorg.
F. 13.	Investigation on twig-blight diseases of orange.	New Scheme	West Bengal.
F. 14.	Research on citrus fruit	New Scheme	West Bengal.
F. 15.	Investigation on diseases of Banana	New Scheme	West Bengal.
F. 16.	Research on pine-apple	New Scheme	West Bengal.
F. 18.	Intensification of research on mango	New Scheme	West Bengal.
F. 19.	Intensification of Research on mango and citrus.	New Scheme	Punjab.
F. 20.	Intensification of Research on pine-apple.	New Scheme	Assam.
F. 22.	Fruit Research	Extension	Orissa.
F. 23.	Banana Research Station	Extension	Madras.
F. 24.	Research on Cashewnut	Extension	Travancore-Cochin.
F. 25.	Coordinated Scheme for the preservation and storage of fruits by the use of hormones and chemicals.	Extension	C.F.T.R.I., Mysore.

F. 26.	Research on pests & diseases affecting cashewnut plantations.	Extension	Madras.
F. 27	Micro-nutrients	Extension	Coorg (Addl. grant).
F. 30.	Construction of buildings at Pashulok (U. P.) under the Horticultural plant introduction scheme.	Extension	I. C. A. R.
F. 31.	Unified control of fruit research schemes in Himachal Pradesh.	Extension	I. C. A. R.
F. 32.	Requisition for the services of an Italian Expert on Horticulture.	Extension	I. C. A. R.
F. 35.	Report of the Sub-Committee of the Horticulture Committee regarding the establishment of regional stations for intensification of research on important fruits.	Extension	I. C. A. R.
F. 48.	Identification and devising of control measures for serious diseases in guava.	Extension	Ajmer.
F. 49.	Establishment of sub-humid tropical horticultural research station on Tripathi Hills.	Extension	Andhra.
F. 52.	Citrus Fruit Research	Extension	Bombay.

G. Vegetables

G. 1.	Onion Research	New Scheme	Andhra.
G. 2.	Improvement of onion and garlic	New Scheme	West Bengal.
G. 3.	Cultivation of mushroom	New Scheme	Himachal Pradesh.
G. 4.	Intergenetic, interspecific and intervarietal hybridization in cucurbits and solanaccous crop plants.	New Scheme	Calcutta University.
G. 5.	Vegetables	New Scheme	Andhra.
G. 6.	Improvement of root crops	Extension	West Bengal.
G. 7.	Coordinated scheme for research on sweet potato and tapioca.	Extension	Travancore-Cochin.
G. 8.	Tuber crops	Extension	Bihar.

H. Speces & Miscellaneous

H. 1.	Cardamom research	New Scheme	Coorg.
H. 2.	Pan Research	New Scheme	Uttar Pradesh.
H. 3.	Pan research	New Scheme	Madras.
H. 4.	Improvement of Lemon grass	New Scheme	Travancore-Cochin.
H. 5.	Research on pepper and cardamom	New Scheme	Orissa.
H. 6.	Improvement of spices	New Scheme	Delhi University.
H. 7.	Regional improvement of Chillies	New Scheme	Andhra.
H. 8.	Research on Coriander	New Scheme	Madras.
H. 9.	Additional staff for the establishment of a research station for the spices plant introduction work in Wynad.	New Scheme	Madras.

H. 10.	Turmeric Research	New Scheme	West Bengal.
H. 11.	Pan research	New Scheme	Madhya Bharat.
H. 13.	Turmeric Research Scheme	New Scheme	Orissa.
H. 14.	Spices and cashewnut shows	New Scheme	I. C. A. R.
H. 15.	Research on Cocoa	Note	I. C. A. R.
H. 16.	Chillies Research	Extension	Andhra.

I. MEDICAL PLANTS

I. 1	Possibilities of the cultivation of cinnamoul camphora in Wynad.	Note	I. C. A. R.
I. 3.	Medicinal Plants	Extension	F. R. I., Dehra Dun.
I. 4.	Medicinal Plants	Extension	Assam.
I. 5.	Ergot	Extension	West Bengal.

J. ENTOMOLOGY

J. 1.	Study of the rate of decomposition of insecticidal deposits.	New Scheme	Osmania University.
J. 2.	Bioassay of indigenous plants insecticides.	New Scheme	Uttar Pradesh.
J. 3.	Research and investigation on Bel Worm pest in crops.	New Scheme	Uttar Pradesh.
J. 4.	Building up named reference collections of insect pests, Agricultural College Bapatla.	New Scheme	Andhra.
J. 5.	Studies in securing the help of natural enemies of insect pests.	New Scheme	Andhra.
J. 6.	Survey, study and control of oil inhabiting insects harmful to agricultural and horticultural crops.	New Scheme	Uttar Pradesh.
J. 7.	Termite Research (Control)	New Scheme	F. R. I., Dehra Dun.
J. 8.	Investigations on the nature and extent of damage by sucking insects.	New Scheme	Punjab University.
J. 9.	Studies on the Soil fauna	New Scheme	Punjab University.
J. 10.	Research on soil fauna particularly insects.	New Scheme	Shri K. D. Baweja.
J. 11.	Studies on the Aphidae	New Scheme	West Bengal.
J. 12.	Research on the toxicology and adverse effects of synthetic Pesticides.	New Scheme	Madras.
J. 13.	Investigation on habits and methods of control of field rats.	New Scheme	Madras.
J. 14.	Fundamental research on the toxicity and mode of action of insecticides.	New Scheme	Punjab University.
J. 17.	Research on the Jowar shoot caterpillar and Jowar shootbug in Malwa Region.	New Scheme	Madhya Bharat.
J. 19.	(A) Paddy Agromyzid Fly	Extension	Hyderabad.

K. MYCOLOGY

K. 1.	Bio-assay and other techniques in the study of plant diseases.	New Scheme	Madras University.
K. 2.	Research on fungicides . . .	New Scheme	Indian Agriclultural Research Institute.
K. 7.	Wilt Diseases of maize . . .	New Scheme	Bihar.
K. 13.	Investigation of rust and downy mildew diseases of sorghum and bajra and tenai and blast disease of ragi.	New Scheme	Madras.
K. 14.	Major Diseases of Barley . .	New Scheme	West Bengal.
K. 16.	Zira Research	Extension .	Rajasthan.
K. 18.	Blast disease of rice and foot rot of wheat.	Extension .	Bombay.

L. AGRICULTURAL IMPLEMENTS

L. 1.	Production, demonstration, trial etc. of improved agriculutral implements.	Extension .	I. A. R. I.

M. ANIMAL BREEDING

M. (a) *Cattle*

M. 1.	Investigations on the progeny testing of bulls under Indian conditions	New Scheme	Co-ordinated Scheme I.C.A.R.
M. 2.	Determination of the age of maturity in Indian bulls.	New Scheme	Orissa.
M. 3.	Evolution of a new breed of dairy cattle by crossing Hariana cows with Jersey bulls.	New Scheme	West Bengal.
M. 4.	Cross-breeding of cattle with Bolstein bulls.	New Scheme	Andhra.
M. 5.	Improvement in milk production of indigenous cattle by cross-breeding with Jersey.	New Scheme	Nasik (Bombay).
M. 6.	Purchase of four Jersey bulls for the Central Artificial Insemination Station, Bangalore.	Note . .	I. C. A. R.
M. 7.	Thickness of skin and distribution of sweat glands of buffaloes in relation to milk production.	New Scheme	I. V. R. I./Punjab.
M. 8.	Possibility of spreading out the breeding season of buffaloes.	New Scheme	I. V. R. I.
M. 9.	Comparative value of selective breeding *versus* grading up of Umblacherry cattle.	New Scheme	Madras.
M. 10.	Comparative value of grading up with Sindhi and Cross-breeding with Jersey.	New Scheme	Travancore-Cochin.
M. 11.	Scheme to supplement Livestock Investigation.	Extension .	Hissar (Punjab).
M. 12.	Influence of the system of rearing on sex behaviour of breeding bulls.	New Scheme	Coordinated Scheme I.C.A.R

M. 13.	Cattle Sterility Extension to remaining Veterinary Colleges.	New Scheme	Co-ordinated Scheme, I. C. A. R.
M. 14.	Estimation of milk suckled by calves in unweaned herds.	New Scheme	Institute of Agriculture, Anand.
M. 15.	Supply of protective clothing to the staff of the Central Artificial Insemination Station, Bangalore.	Note	I. C. A. R.
M. 16.	Study of the effect of castration of male buffaloes and cattle at different ages on their utility for draught.	New Scheme	I. C. A. R.
M. 17.	Physiology of the hump, dewlap and sheath.	New Scheme	West Bengal.
M. 18.	Progeny testing of Murrah bulls	New Scheme	Aarey (Bombay).
M. 19.	Cross-breeding of cattle in hilly and heavy rainfall areas West Bengal. Proposal for additional Stockmen.	Note	I. C. A. R.
M. 20.	Evolving suitable draught capacity standard for bullocks.	Extension	I. V. R. I.
M.20(A)	The ideal animal to be aimed at by the Breeder in breeding for High Production Definition of.	Note	I. C. A. R.

M. (b) *Sheep and Wool*

M. 21.	Wool Analysis Laboratory	Extension	Gaya (Bihar)
M. 22.	Sheep and Wool Improvement on regional basis.	Extension	Uttar Pradesh.
M. 23.	Sheep and Wool Improvement on regional basis.	Extension	Poona (Bombay)
M. 24.	Sheep and Wool Improvement on regional basis.	Extension	Gaya (Bihar).
M. 25.	Wool Utilisation Centre	New Scheme	Madras.
M. 26.	Skin studies of sheep	New Scheme	I. C. A. R.
M. 27.	Developing mutton breeds of sheep	New Scheme	Chingleput (Madras).
M. 28.	Research units for study of sheep production in a mixed farming economy.	Model Scheme	I. C. A. R.

M. (c) *Goat*

M. 29.	Exploring the possibilities of mohair production.	New Scheme	Andhra.
M. 30.	Indigenous Goat Breeding	Extension	Hissar (Punjab)

M. (d) *Poultry Duck*

M. 31.	Defertilization of eggs follow up work.	New Scheme	I. V. R. I.
M. 32.	Studies on the growth rate and egg production of Purebred *versus* cross-bred poultry when fed on two different diets.	New Scheme	West Bengal.
M. 33.	Correlation between physical body characteristics and egg production.	New Scheme	I. V. R. I.

M. 34.	Economics of poultry keeping .	New Scheme	Agricultural Institute Katpadi.
M. 35.	Studying the influence of climate on the performance of improved desi fowls.	Extension .	Orissa.
M. 36.	Egg laying trials	Extension .	I. V. R. I.
M. 37.	Chick Hatchery Processing Plant—Additional Funds.	Note . .	I. C. A. R.

M. (e) *Other Livestock*

M. 38.	Production of sterility in Indian monkeys by drug therapy.	New Scheme.	C. D. R. I.
M. 39.	Establishment of a Camel Farm for the Bikaneri breed and opening of 10 Key Village Centres for the improvement of camels in Rajasthan.	New Scheme	I. C. A. R.
M. 40.	Diploma Course in Swine Husbandry and Pork Processing.	New Scheme	Uttar Pradesh.
M. 41.	Evolving a new type of pigs by cross-breeding.	New Scheme	Uttar Pradesh.

N. *Animal Nutrition*

N. 1.	Investigating the causes of delayed maturity of cattle under village conditions and its effect on reproduction.	Preparation of Model Schemes.	Orissa, Punjab, Andhra, Pepsu, Madras, Travancore Cochin, Mysore, Bhopal, Kutch, U. P., Bihar, Hyderabad, Ajmer and Madhya Pradesh.
N. 2.	Determination of economic Poultry rations.	New Scheme	Andhra, Madras, and Punjab.
N. 3.	Investigations of the toxic plants and herbs lethal to domestic animals.	Revised Scheme.	West Bengal.
N. 4.	Investigations on the nutritional requirements of goats in Orissa.	New Scheme	Orissa.
N. 5.	Response of different breeds to different levels of nutrition.	New Scheme	West Bengal.
N. 6.	Evaluation of vitamin adequacy and specific metapolic functions in livestock.	New Scheme	West Bengal.
N. 7.	Investigation on the nutritional requirements of pigs.	New Scheme	I. V. R. I.
N. 8.	Effect of nutrition on animal products in cows and buffaloes.	New Scheme	I. V. R. I.
N. 9.	Investigation on the quality of wool and meat in relation to the nutrition of sheep.	New Scheme	B. R. College, Agra.
N. 10.	Investigations on the causes of degeneration of cattle in humid climate.	Extension .	I. V. R. I.
N. 11.	Utilisation of waste products as cattle feed.	Extension .	Orissa.
N. 12.	Investigation of physiological norms of Indian Cattle with special reference to West Bengal.	Extension .	West Bengal.

N. 13.	Further Work on paddy straw	Extension	I. V. R. I.
N. 14.	Study of the value of urea as a protein substitute in the rations of cows and buffaloes for growth and milk production.	Additional Grant.	I. V. R. I.
N. 15.	Provision of one A. R. O. one statistical Assistant and One Stenographer for the Co-ordinating Officer (Animal Nutrition).	Note.	I. C. A. R.
N. 16.	Provision of jeeps and additional equipment for each of the Regional Animal Nutrition Research Stations.	Note	I. C. A. R.

O. DAIRY SCIENCE

O. 1.	'Let down, response of some breeds of Indian cows and buffaloes and the scope of milking them mechanically.	New Scheme	Andhra.
O. 2.	Survey of bacteriological quality of milk supply in Andhra.	New Scheme	Andhra.
O. 3.	Survey of bacteriological quality of milk supply in Allahabad.	New Scheme	Allahabad Agricultural Institute.
O. 4.	Economics of specialized dairy farming.	New Scheme	West Bengal.
O. 5.	Economics of specialized dairy farming.	New Scheme	Institute of Agricultural Anand.
O. 6.	Economics of specialized dairy farming.	New Scheme	I. V. R. I.
O. 7.	Economics of specialized dairy farming.	New Scheme	Madras.

P. ANIMAL DISEASES

P. 1.	Disease Investigation Officer's scheme.	Extension	Travancore-Cochin.
P. 2.	Humpsore scheme.	Extension	Orissa.
P. 3.	Assistant Disease Investigation Officer (Sheep and Goats).	Extension	Uttar Pradesh.
P. 4.	Mass investigation of village poultry against Ranikhet disease.	Extension	Bombay.
P. 5.	Bovine contagious Pleuro-pneumonia.	Extension	Assam.
P. 6.	Bionomical studies of common flukes	New Scheme	West Bengal.
P. 7.	Studies on mycotic diseases	New Scheme	West Bengal.
P. 8.	Studies in animal filarids and filariasis.	New Scheme	Bihar.
P. 9.	Investigation of brucellosis	New Scheme	Bihar.
P. 10.	Control of H. S., black quarter and anthrax in endemic area.	New Scheme	Madras.
P. 11.	Study of Rickettsial infections in domesticated animals.	New Scheme	Madras.

P. 12.	Appointment of Assistant Research Officer (Ascariasis).	New Scheme	Andhra.
P. 13.	Investigations into the possibilities of large-scale manufacture of H.S. Adjuvant Vaccine.	New Scheme	I. V. R. I.
P. 14.	Keeping quality of Veterinary Biological Products.	New Scheme	I. V. R. I.
P. 15.	Experimental study of Bovine anaesthesia.	New Scheme	Orissa.
P. 16.	Investigations on the use of stabilizers in Rinderpest and Ranikhet disease Vaccines.	New Scheme	Uttar Pradesh.

Q. HIDES AND SKINS

Q.1.	Research on the manufacture of "fat-liquors" from indigenous raw materials for leather production from Indian hides and skins.	Extension .	C. L. R. I.
Q. 2.	Research on the manufacture of Chrome retan leather from cow hides for military purposes.	Extension .	C. L. R. I.
Q. 3.	Research on the manufacture of leather boards from leather shavings which are waste products of tanneries.	Extension .	C. L. R. I.
Q. 4.	Improvement of quality of shoe upper and industrial leather manufactured by mineral tanning.	Extension .	C. L. R. I.

R. NIL

S. RISHERIES

S. 1.	Scheme for the study of Microbial flora associated with fresh water fish in West Bengal as well as with the estuarine and deep sea fish from the Bay of Bengal.	New Scheme	West Bengal.
S. 2.	Investigation on processing inedible unpopular fish caught in West Bengal.	Extension .	West Bengal.

T. APICULTURE

T. 1.	Establishment of Bee-keeping Research Centre for Northern Region.	New Scheme	Himachal Pradesh.
T. 2.	Improving honey yield of bee-hives	New Scheme	Andhra.
T. 3.	Cytogenetical and Histochemical studies on the male and female germs cells of the honey bee.	New Scheme	Punjab University.
T. 4.	*Deleted.*		
T. 5.	*Deleted.*		

U. EDUCATION AND TRAINING

U. 1.	Indian Council of Agricultural Education.	Extension	I. C. A. R.

V. NIL

W. AGRICULTURAL ECONOMICS

W. 1.	Study of mechanised farming	New Scheme	Banaras Hindu University
W. 2.	Study of advantages and Economics of mechanised farming.	New Scheme	Madras.
W. 3.	Collection of data in respect of production, consumption, surplus and survey of economics of milk in the twin cities of Hyderabad and Secunderabad.	New Scheme	Indian Institute of Economics, Hyderabad.
W. 4.	Investigation to ascertain the use and wastage of man and cattle power in the production of principal crops and the cost of production of such crops.	New Scheme	West Bengal.
W. 5.	Studies in the cost of reclamation of Kullar (Alkali) Lands under Canal-Cum-Tube-Well irrigation.	New Scheme	Khalsa College, Amritsar.
W. 6.	Survey of Farm and Non-Farm Employment in South Arcot District.	New Scheme	Annamalai University.
W. 7.	Enquiry into factors influencing cropping patterns on individual farms.	New Scheme	I. C. A. R.
W. 8	Study on adoption of improved practices of different types of farms.	New Scheme	I. C. A. R.
W. 9	Survey and study of the agricultural conditions, problems, and practices, of Uttar Pradesh.	New Scheme	Uttar Pradesh.

X. STATISTICS

X. 1.	Evolving of a suitable technique for ascertaining cost of milk production. (Second Five Year Plan).	New Scheme	I. C. A. R.
X. 2.	Study of breeds, milk yield and feeding and managing practices of bovines (Second Five Year Plan).	Extension	I. C. A. R.
X. 3.	Further Investigations on the technique of sampling of fleeces for assessing wool quality.	New Scheme	I. C. A. R.
X. 4.	Pilot Investigation for study of cultivation practices and yields of pepper in Madras and Travancore-Cochin.	Extension	I. C. A. R.

Y. Publications and Publicity

Y. 1.	Preparation of monograph on Algae	New Scheme	I. C. A. R.
Y. 2.	Preparation of monographs on Fungi	New Scheme	I. C. A. R.
Y. 3.	Preparation of monograph on Agricultural Meteorology.	New Scheme	I. C. A. R.
Y. 4.	Reprinting of the Handbook "Statistical Methods for Agricultural Workers".	New Scheme	I. C. A. R.
Y. 5.	Translation into Spanish of the book "Statistical Methods for Agricultural Works" by V. G. Panse and P. V. Sukhatme.	New Scheme	I. C. A. R.
Y. 6.	Supply of Agricultural Information Literature to the National Extension Service Blocks.	Extension .	I. C. A. R.
Y. 7.	Printing of the Hindi Journal "Kheti".	Extension .	I. C. A. R.
Y. 8.	Bringing out of I. C. A. R. publications in Regional Languages.	Extension .	I. C. A. R.
Y. 9.	Publication of a Quarterly popular Journal "Indian Horticulture".	New Scheme	I. C. A. R.
Y. 10	Preparation of Summaries in English and Hindi of the Minister's Circular letters for the use of Community Projects and National Extension Service Blocks. Additional staff under the Editor's scheme.	New Scheme	I. C. A. R.
Y. 11.	Publication of a Monograph on Rice.	New Scheme	I. C. A. R.
Y. 12.	Publication of a Quarterly Journal on Agricultural Education.	New Scheme	I. C. A. R.
Y. 13	Free Supply of I. C. A. R. Publications to the various agricultural and Veterinary Colleges in India.	New Scheme	I. C. A. R.
Y. 14	Printing of the Monograph on "Poultry".	New Scheme	I. C. A. R.
Y. 15	Printing of the Monograph on "Mango".	New Scheme	I. C. A. R.
Y. 16	Change in the layout and presentation of material in the "Rice News Teller" and fixation of its price.	Additional Grant.	I. C. A. R.
Y. 17.	Publication of Crop Calendars, Crop Diaries and charts of plant diseases.	Extension .	I. C. A. R.

PROCEEDINGS

The following were present :

MEMBERS

1. Dr. M. S. Randhawa, I.C.S., Vice President, Indian Council of Agricultural Research (Chairman).
2. Dr. B. N. Uppal, Agricultural Commissioner with the Government of India.
3. Shri D. N. Singh, Deputy Agricultural Extension Commissioner with the Government of India, *vice* Agricultural Extension Commissioner with the Government of India.
4. Dr. V. G. Panse, Statistical Adviser, Indian Council of Agricultural Research.
5. Dr. B. P. Pal, Director, Indian Agricultural Research Institute.
6. Shri L. Sahai, Director, Indian Veterinary Research Institute.
7. Dr. J. S. Patel, Adviser (Agriculture), Community Projects Administration.
8. Dr. K. C. Sen, Director, National Dairy Research Institute.
9. Dr. Pushkar Nath, Director, Central Potato Research Institute.
10. Shri M. B. Ghatge, Agricultural Marketing Adviser to the Government of India.
11. Shri K. S. Rao, *vice* Economic and Statistical Adviser, Ministry of Agriculture.
12. Shri I. J. Naidu, I.A.S. Director of Agriculture, Andhra Pradesh.
13. Shri L. K. Handique, Director of Agriculture, Assam.
14. Shri B. P. Akhuary, Director of Agriculture, Bihar.
15. Shri P. D. Nair, Director of Agriculture, Kerala.
16. Shri R. M. Sundaram, I.C.S., Director of Agriculture, Madras.
17. Shri G. C. Dash, Director of Agriculture, Orissa .
18. Dr. Arjan Singh, Director of Agriculture, Punjab.
19. Shri Shamsher Singh, Deputy Director of Agriculture, *vice* Director of Agriculture and Food Production, Rajasthan.
20. Shri Ram Surat Sing, Director of Agriculture, Uttar Pradesh.
21. Shri E. A. R. Banerji, Joint Director of Agriculture, *vice* Director of Agriculture, West Bengal.
22. Shri G. M. Dutt, Director of Agriculture, Jammu and Kashmir.
23. Shri N. Bhagwandas, I.A.S., Director of Animal Husbandry, Andhra Pradesh.
24. Shri S. R. Chadha. Director of Veterinary Services, Bombay.
25. Shri V. K. Madhava Menon, Director of Animal Husbandry, Kerala.

26. Shri D. Pattabhiraman, Director of Animal Husbandry, Madras.
27. Shri K. S. Shetty, Director of Animal Husbandry, Mysore.
28. Shri R. R. Gulati, Director of Veterinary Services and Chief Warden of Fisheries, Punjab.
29. Shri G. S. Rathore, Deputy Director of Veterinary Services, Rajasthan.
30. Dr. S. Datta, Director of Veterinary Services and Animal Husbandry, West Bengal.
31. Shri V. L Wazir, Director of Veterinary Services, Jammu and Kashmir.
32. Shri K. L. Aggarwal, I.F.S., President, Forest Research Institute and Colleges, Dehra Dun.
33. Shri B. S. Venkataratnam Chaudhury, President, Co-operative Central Bank Ltd., Andhra Pradesh.
34. Shri B. L. Sethi, Secretary, Indian Central Cotton Committee.
35. Shri Mohanlal Ambalal Parikh, of Messrs. Mohanlal Hargovindas, representative, Indian Central Tobacco Committee.
36. Shri L. C. Sikka, Dairy Development Adviser to the Government of India.
37. Dr. T. J. Mirchandani, Director, Soil Conservation Department, Damodar Valley Corporation.
38. Dr. E. S. Narayanan, Head of the Division of Entomology, Indian Agricultural Research Institute.
39. Shri D. A. Gadkari, Joint Director of Agriculture (Engineering), Bombay.
40. Dr. N. D. Kehar, Head of the Division of Animal Nutrition, Indian Veterinary Research Institute.
41. Shri S. G. Iyear, Head of the Division of Poultry, Indian Veterinary Research Institute.
42. Dr. P. Bhattacharya, Head of the Department of Animal Genetics, Indian Veterinary Research Institute.
43. Shri Pritam Singh, Secretary, Indian Lac Cess Committee.
44. Dr. P. J. Gregory, Secretary, Indian Central Coconut Committee.
45. Dr. R. Sankaran, Secretary, Indian Central Oilseeds Committee.
46. Dr. M. D. Patel, Director, Institute of Agriculture, Anand.
47. Sardar Lal Singh, Member, Lok Sabha.
48. Dr. R. L. Kaura, Cattle Utilization Adviser to the Government of India.
49. Shri Bishan Mansingh, Chairman, Uttar Pradesh Board of Agriculture.

Shri J. V. A. Nehemiah, Secretary, Indian Council of Agricultural Research.

Shri S. K. Mirchandani, Additional Secretary, Indian Council of Agricultural Research.

VISITORS AND OFFICERS OF THE COUNCIL

1. Shri Santokh Singh, Officer on Special Duty (Agriculture), Planning Commission.
2. Shri R. N. Mathur, Forest Research Institute, Dehra Dun.
3. Shri M. Kantiraj, Director of Agriculture, Manipur.
4. Dr. R. J. Kalamkar, Additional Agricultural Commissioner with the Government of India.
5. Shri M. U. S. Jung, Deputy Agricultural Commissioner with the Government of India.
6. Shri K. P. R. Kartha, Deputy Livestock Adviser to the Government of India.
7. Shri M. R. Mahajan, Secretary, Central Rinderpest Control Committee.
8. Dr. Sham Singh, Assistant Agricultural Commissioner with the Government India.
9. Dr. J. A. Daji, Assistant Agricultural Commissioner with the Government of India.
10. Shri R. N. Mohan, Assistant Animal Husbandry Commissioner with the Government of India.
11. Shri P. L. Malhotra, Under Secretary, Indian Council of Agricultural Research.
12. Shri R. K. Ram, Under Secretary, Indian Council of Agricultural Research.
13. Shri Vas Dev, Under Secretary, Indian Council of Agricultural Research.
14. Shri Ajudhya Prasad, Under Secretary, Indian Council of Agricultural Research.
15. Shri P. G. Salvi, Under Secretary, Indian Council of Agricultural Research.
16. Dr. Uttam Chand, Professor of Statistics, Indian Council of Agricultural Research.
17. Dr. U. N. Chatterji, Editor (Research), Indian Council of Agricultural Research.
18. Shri S. S. Khot, Liaison Officer, (Goat, Sheep and Wool), Indian Council of Agricultural Research.
19. Shri M. G. Kamath, Editor (Magazine), Indian Council of Agricultural Research.
20. Shri Prem Nath, Editor (Books), Indian Council of Agricultural Research.
21. Shri C. L. Suri, Administrative Officer, Indian Council of Agricultural Research.
22. Shri F. C. Mehrotra, Chief Superintendent, Indian Council of Agricultural Research.
23. Shri J. S. Srivastava, Officer-in-charge (Milk Potentialities), Indian Council of Agricultural Research.

Before proceeding with the items on the agenda. the Chairman addressed the Advisory Board (*vide* Appendix I). Thereafter the items on the agenda were taken up.

A.—GENERAL

SUBJECT NO. A-1

ACTION TAKEN ON THE GENERAL RECOMMENDATIONS MADE BY THE BOARD OF RESEARCH AND THE ADVISORY BOARD AT THEIR MEETINGS HELD IN JANUARY, 1956

The Chairman said that the information regarding the area under improved varieties of foodgrains had been furnished only by Punjab and Assam. No other State had furnished the information. It was necessary that the data should be furnished by all concerned at a very early date. It was only after the full picture was known that any progress could be made with the seed multiplication programme. The Patwaris should be persuaded to collect this data. In fact, the States should bring about close liaison between the State Agriculture Department and the Revenue Agency.

The Chairman requested the representatives of the various States to explain the position obtaining in their respective States:—

Shri Banerji, Joint Director of Agriculture, West Bengal, said that, due to unprecedented floods this year in that State, the staff had to be diverted to do relief work, setting aside the other normal work of the department.

As West Bengal had floods only during the current year and as the figures in respect of the previous years had also not been supplied by that state, the Chairman desired to know whether there was any machinery in the state to undertake the job. Shri Banerji replied that there was no proper machinery to collect the information. Thereupon, the Chairman remarked that that work could conveniently be done only by the Patwaris and not by the Extension staff.

Punjab

Dr. Arjan Singh, Director of Agriculture, Punjab said that the figures supplied by his state were probably only estimates. The staff of the Revenue Department should be educated to divide the yields into two distinct patterns,—*i.e.*, improved and unimproved varieties, and they should indicate the areas falling under these two different categories. In that way it would be possible to collect the figures. There was at present some difficulty experienced in this regard by the revenue departments. He felt that very good estimates could be given by the staff of the agriculture department and extension blocks. Accurate figures could be ensured in case the statistics were collected from all the sources and then compiled. The District Agricultural Officer should take more interest in the work.

Madras

Shri Sundaram, Director of Agriculture, Madras said that there was on difficulty whatsoever as far as Madras was concerned.

Andhra Pradesh

Shri Naidu, Director of Agriculture, Andhra Pradesh said the figures were probably given by his state separately for Andhra and Hyderabad, and that these were probably required in a new form. Actually, for the coverage in regard to figures of improved varieties, Andhra Pradesh did not depend upon the revenue department, nor was it wise to do so. The lowest man in the agriculture department was entrusted with the job of making enquiries in this respect. This was a dependable way.

Bihar

Shri Akhaury, Director of Agriculture, Bihar said that it was very difficult to get accurate information by depending on the Revenue department staff. This would only be possible through the N.E.S. and C.P. blocks as and when they were opened.

Bombay

Shri Gadkari, Joint Director of Agriculture, Bombay said that information was being collected and would be supplied shortly.

Rajasthan

Shri Shamsher Singh, Deputy Director of Agriculture, Rajasthan said that the staff of the Revenue Department were not well-versed with the work as they could not distinguish between an improved variety and an unimproved variety. Consequently, the statistics collected was far from dependable.

Dr. B. P. Pal, Director, Indian Agricultural Research Institute said that apart from the area under existing varieties of improved crop, something should be done in the matter of propagation of new varieties. In foreign countries, when new varieties were introduced, within 2 to 3 years time these spread to millions of acres whereas in this country, the plant breeders went on producing varieties but the pace of its propagation was very slow. It was desirable that each State should have somebody responsible—perhaps by constituting a small Committee consisting of all the botanists, agronomists and others concerned, to evolve a system whereby someone was made responsible to watch the introduction of new varieties, lay down targets etc. On this basis, a good beginning could be made.

The Chairman said that something should be done to protect some of the *food* plants in Punjab and Kashmir from perishing by the attack of pests. Dr. Arjan Singh said that so far as Punjab was concerned it was intended to introduce improved varieties in the hill areas subject to the availability of the seed.

SUBJECT NO. A-2

GENERAL RECOMMENDATIONS MADE BY THE SCIENTIFIC AND COMMODITY COMMITTEES AT THEIR MEETINGS HELD IN APRIL AND OCTOBER, 1956 (APPENDIX II)

The Advisory Board approved the recommendations made by the Scientific and Commodity Committees as endorsed by the Boards of Research and Extension.

SUBJECT NO. A-3

OBSERVATIONS MADE BY THE SCIENTIFIC AND COMMODITY COMMITTEES ON THE NEW SCHEMES AND PROPOSALS FOR THE CONTINUANCE OF CURRENT SCHEMES LISTED UNDER SECTIONS B TO Y TOGETHER WITH THE REMARKS OF THE BOARD OF RESEARCH AND THE BOARD OF EXTENSION THEREON (APPENDIX III).

The new schemes and the proposals for the continuance of the current schemes listed under sections B to Y were considered by the Advisory Board one by one and the recommendations of the Board thereon are given under the relevant items in the following pages. Remarks made at the Joint Meeting of the Board of the Research and the Board of Extension are given in Appendix IV.

SUBJECT NO. A-4

PREPARATION OF A PRIORITY LIST IN RESPECT OF NEW SCHEMES RECOMMENDED FOR SANCTION

The priority list prepared by the Board of Research was approved by the Advisory Board with the remark that the proposal regarding the appointment of staff for co-ordination of animal husbandry research work should be given top priority among the animal husbandry schemes.

SUBJECT NO. A-5

NOTES ON POLICY MATTERS SUGGESTED BY THE MEMBERS OF THE ADVISORY BOARD

Nil.

SUBJECT NO. A-6

REVIEW NOTES BY THE BOARDS OF RESEARCH AND EXTENSION ON THE VARIOUS AGRICULTURAL AND ANIMAL HUSBANDRY SUBJECTS (APPENDIX V)

The recommendations made by the Working Parties on Agriculture and Animal Husbandry were explained by Dr. Uppal and Dr. L. C. Sikka respectively. The Representatives of the Central Commodity Committees also explained the position with regard to the commodities with which their Committees were concerned.

The Chairman suggested that the assistance of the Community Projects Administration and the National Extension Service should be utilised as far as possible in all matters with which they were concerned *e.g.*, extension of improved varieties, grant of loans, provision of equipment, etc.

He also said that the technique adopted by the Central Cotton Committee for dissemination of new breeds should *mutatis mutandis* be adopted by the other Central Commodity Committees who should put up necessary schemes for that purpose.

Subject to the above suggestions, the Advisory Board approved the recommendations made by the Joint meeting of the Board of Research and the Board of Extension.

The Board also recommended that work on production of vaccine for foot and mouth disease should be intensified and efforts made to produce less costly vaccine.

SUBJECT NO. A-7

NOTES ON POLICY MATTERS PERTAINING TO AGRICULTURAL AND ANIMAL HUSBANDRY RESEARCH AND EXTENSION WORK PREPARED BY THE BOARDS OF RESEARCH AND EXTENSION

The Board endorsed the recommendations made at the Joint meeting of the Board of Research and the Board of Extension (Appendix IV).

SUBJECT NO. A-8

CONTROL AND TREATMENT OF SURRA AND BOVINES AND EQUINES, NEW SCHEME, MADRAS

Dr. L. C. Sikka explained the recommendation made by the Working Party on Animal Husbandry which was approved by the Joint meeting of the Board of Research and Board of Extension.

Shri Laxmi Sahai, Director, Indian Veterinary Research Institute said that it was for the State Governments to carry out mass vaccination.

The Chairman remarked that intensification of research work in this connection should be taken up by the Indian Veterinary Research Institute and mass vaccination by the State Governments. The Advisory Board approved the suggestions made by the Chairman.

SUBJECT NO. A-8(A)

EXPLOITATION OF INVENTIONS BY THE NATIONAL RESEARCH DEVELOPMENT CORPORATION—GENERAL AGREEMENT WITH GOVERNMENT FOR APPORTIONMENT OF PREMIA AND EXPLOITATION OF PATENTS

The Advisory Board endorsed the recommendations made by the Boards of Research and Extension at their Joint meeting.

SUBJECT NO. A-8(B)

CO-ORDINATION OF RESEARCH ON ANIMAL HUSBANDRY—APPOINTMENT OF STAFF FOR SCRUTINISING REPORTS, PROGRAMMES, ETC., FROM STATE GOVERNMENTS, COMMODITY COMMITTEES, CENTRAL INSTITUTIONS, ETC.

Dr. L. C. Sikka said that the Working Party on Animal Husbandry considered that an officer of the status of Junior Class I would not be competent to scrutinise the programmes, etc., received from the State Governments. He mentioned that the Working Party was in favour of appointing Subject-matter Specialists who could adequately go into these reports and programmes, which were often of comprehensive nature.

Shri Nehemiah said that it was not the intention that the staff asked for should scrutinise the reports. What was intended was that the staff would study the reports and programmes received from

State Governments etc., and prepare every year reviews of research work done in different subjects on the animal husbandry side in the country as a whole, to facilitate the work of scientific Committees while scrutinizing reports and programmes as was already being done on the agriculture side. As regards the question of providing Subject-matter Specialists referred to by Dr. Sikka, a recommendation to that effect had been made by the Indo-American Team and was being considered separately.

The Board approved the proposal.

SUBJECT NO. A-9

DETAILS OF SANCTIONS ACCORDED BY THE STANDING FINANCE COMMITTEE AND THE GOVERNING BODY AT THEIR MEETINGS HELD IN FEBRUARY, 1956

Noted.

SUBJECT NO. A-10

CONSTITUTION OF A FLORICULTURE COMMITTEE UNDER THE COUNCIL.

The Chairman said that a representative of the Plant Protection Organization and Shri S. Percy Lancaster should be appointed on the Floriculture Committee as proposed by that Committee and invited suggestions from the members regarding further additions and alterations in the personnel of the Committee. The names of Shri L. K. Handique, the present Director of Agriculture, Assam and Shri L. Venkataratnam, the present Horticulturist to the Government of Andhra Pradesh were suggested for inclusion in the list of members of the Committee and the names of Mrs. Devi Chand Sawhney and Mrs. W. F. B. Price for deletion from the list.

The Advisory Board agreed to the proposals.

SUBJECT NO. A-11

CONSTITUTION OF AN APICULTURE COMMITTEE AS A REGULAR SCIENTIFIC COMMITTEE UNDER THE COUNCIL

The proposal was recommended to the Standing Committee for approval.

SUBJECT NO. A-12

CONSTITUTION OF A PARASITOLOGY COMMITTEE AS A REGULAR SCIENTIFIC COMMITTEE UNDER THE COUNCIL

Deleted.

SUBJECT NO. A-13

APPOINTMENT OF ADDITIONAL MEMBERS ON CERTAIN SCIENTIFIC COMMITTEES OF THE COUNCIL

The proposals were recommended for acceptance by the Standing Committee.

SUBJECT NO. A-14

RECONSTITUTION OF THE REGIONAL COMMITTEES

The Chairman said, that, as a result of the reorganization of States, it had become necessary to redefine the territories comprising the agricultural and animal husbandry regions and revise the personnel of the Regional Committees as given in Enclosures II and III. Dr. Datta suggested that the name of West Bengal should be included in the Temperate Himalayan Region and personnel of the Regional Committees should be modified accordingly. Another member suggested that one geneticist should also be included in the Regional Committees on the animal husbandry side. The Advisory Board recommended that the Agricultural and Animal Husbandry Regions should be redefined and the Regional Committees should be reconsituated as detailed in Enclosures II and III to the Secretariat note on the subject, with the modifications suggested by Dr. Datta. As regards the inclusion of a geneticist in the Regional Committees on the Animal Husbandry side, the Board recommended that this should be examined by the Secretariat of the Council.

SUBJECT NO. A-15

COMPARISON OF THE VALUE OF RESEARCH FELLOWSHIPS

Having regard to the value of the Research Fellowships awarded by other organizations similar to the Council, the Advisory Board recommended that the value of the Junior and Senior fellowships should be raised by the Indian Council of Agricultural Research from Rs. 100 and Rs. 150 per month to Rs. 150 and Rs. 200 respectively.

SUBJECT NO. A-16

PROPOSAL TO APPOINT PROJECT CO-ORDINATORS FOR CO-ORDINATED SCHEMES SPONSORED BY THE COUNCIL

The Vice President said that the proposal was that specialists of the Central Research Institutes as well as of the State Research Institutions who knew some subjects thoroughly should be appointed as Project Co-ordinators. They would make local inspection of work and would guide the research workers. The qualifications of the Project-Co-ordinators as laid down were that they should be actively engaged in the problem fields in which they were serving as co-ordinators. They should command respect and acceptance by the Central and State institutions co-operating in the scheme.

Dr. Uppal, The Agricultural Commissioner added that the question of appointment of Project Co-ordinators arose out of the recommendations of the Indo-American Team. Naturally, the Project Coordinator should be a person who knew something about the project and was necessarily actively engaged in the research work of his own field. It would not be proper to foist on the research workers a person who had got only general knowledge of the work and was not actively engaged in the pursuit of that work or research. The point for consideration by the Advisory Board was whether the project coordinator should necessarily be a person actively engaged in the project as was the intention of the Indo-American Team. This, however, had been the general policy followed all over India and abroad. Dr. Uppal further said that the other point for consideration by the Board was whether the Co-ordinator should be assigned, both guiding and supervisory duties, over other persons working in the schemes. He was of the opinion that it would be very dangerous to entrust the supervisory duties to the Project Co-ordinator who, being a senior person in his own field, should really, on the contrary, act as a friend and a guide to the research worker and thus help him in his work. Dr. Uppal also said that the Co-ordinator should submit his report to the Indian Council of Agricultural Research on the project visited by him.

The Vice President said that the Project Co-ordinator was not at all a supervisor but a friend and a guide to the Research worker. The Advisory Board agreed with the views expressed by Dr. Uppal (a) that the Project Co-ordinator should necessarily be a person actively working in the particular problem field or scheme and (b) that he should not be assigned supervisory duties but he should act as a friend and a guide to the research workers engaged on the subject.

B.—BOTANY AND PHYSIOLOGY

SUBJECT NO. B-1

BLAST RESISTANT VARIETIES OF PADDY, NEW SCHEME—WEST BENGAL.

The Advisory Board endorsed the recommendations of the Eastern Regional Committee and the Botany Committee and did not recommend the scheme.

SUBJECT NO. B-2

INDUCTION AND STUDY OF AMPLIPLOIDY IN RICE, NEW SCHEME—WEST BENGAL

The Advisory Board endorsed the recommendations of the Eastern Regional Committee and the Botany committee and recommended the scheme for sanction.

SUBJECT NO. B-3

BREEDING OF DROUGHT RESISTANT STRAINS OF PADDY, NEW SCHEME—WEST BENGAL

The Advisory Board accepted the recommendations of the Eastern Regional Committee and did not recommend the scheme for sanction.

SUBJECT NO. B-4

HILL PADDY IMPROVEMENT, NEW SCHEME—UTTAR PRADESH

The Advisory Board endorsed the recommendations of the Eastern Regional Committee and the Botany Committee and recommended the scheme.

SUBJECT NO. B-5

LATE PADDY IMPROVEMENT, NEW SCHEME—UTTAR PRADESH

The Advisory Board did not recommend the scheme for sanction as the work envisaged formed part of the normal activities of the State Agricultural Department.

SUBJECT NO. B-6

DEEP WATER PADDY, NEW SCHEME—UTTAR PRADESH

The Advisory Board recommended the scheme for sanction subject to the remarks of the Botany Committee.

SUBJECT NO. B-7

DRY LAND PADDY AND BORO PADDY, NEW SCHEME—UTTAR PRADESH

The Advisory Board recommended the scheme for extension subject to the condition that the work under the scheme should be restricted to Boro paddy only.

SUBJECT NO. B-9

CYTOLOGICAL STUDIES ON MAIZE, NEW SCHEME—ANDHRA UNIVERSITY

At the Advisory Board Dr. Uppal explained briefly the recommendations of the Southern and Coastal Regional Committee, and the Botany Committee and said that the scheme had been recommended for a period of three years since Professor Venkatsavarlu had been working on the same subject and had already built up useful genetic material. The Advisory Board recommended the scheme for sanction for a period of three years subject to the remarks of the Botany Committee.

SUBJECT NO. B-10

DROUGHT RESISTANCE IN WHEAT, NEW SCHEME—MADHYA PRADESH

The Advisory Board recommended the scheme for sanction subject to the remarks of the Botany Committee.

SUBJECT NO. B-11

BREEDING RUST RESISTANT VARIETIES OF WHEAT, NEW SCHEME—WEST BENGAL

The Advisory Board recommended the scheme for sanction on the condition that the work should be restricted only to one centre in the Damodar Valley Corporation area and the staff should be reduced as recommended by the Botany Committee.

SUBJECT NO. B-12

SUPER DROUGHT RESISTANT JOWAR EVOLUTION AND EXPLOITATION OF HYBRID VIGOUR IN JOWAR, NEW SCHEME,—MADRAS

The Advisory Board endorsed the recommendations of the Eastern Regional Committee and the Botany Committee and did not recommend the scheme for sanction.

SUBJECT NO. B-13

MULTIPLICATION AND DISTRIBUTION OF HYBRID SAJJA (BAJARA), NEW SCHEME—ANDHRA

The Advisory Board did not recommend the scheme for sanction as this work had also to be taken up in one of the centres under the co-ordinated scheme.

SUBJECT NO. B-14

GENETIC STUDIES ON SORGHUM, NEW SCHEME—INSTITUTE OF PLANT INDUSTRY, INDORE

The Advisory Board endorsed the recommendations of the Southern and Coastal Regional Commitees and did not recommend the scheme for sanction.

SUBJECT NO. B-15

CO-ORDINATED MILLET SCHEME—NEW SCHEME, INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board adopted the recommendation of the Botany Committee, and the note was recorded.

SUBJECT NO. B-16

PULSE RESEARCH SCHEME—NEW SCHEME, ASSAM

At the Advisory Board, Dr. Uppal briefly explained the recommendations of the Eastern Regional Committee and the Botany Committee and said that the scheme was not recommended in its present form and that an expert would be sent to Assam to help the Government in drawing up the scheme. The principle of sanctioning the Pulse Research Scheme in Assam was accepted and the Advisory Board recommended sanction of funds for the same.

SUBJECT NO. B-17

IMPROVEMENT OF PULSES, NEW SCHEME—ANDHRA

The Advisory Board endorsed the recommendations of the Southern and Coastal Regional Committees and the Botany Committee and recommended the scheme for sanction.

SUBJECT NO. B-18

IMPROVEMENT OF INDIAN PULSES OF HIGH NUTRITIVE QUALITY AND NITROGEN FIXING CAPACITY AT COIMBATORE AND ADUTHUARI, NEW SCHEME—MADRAS

The Advisory Board endorsed the recommendations of the Southern and Coastal Regional Committees and the Soil Science Committee, and did not recommend the scheme.

SUBJECT NO. B-19

INVESTIGATION ON CYTOGENETICS AND MORPHOGENESIS OF NODULES OF SOME COMMON INDIAN LEGUMINOUS CROPS, NEW SCHEME—WEST BENGAL

The Advisory Board endorsed the recommendations of the Botany Committee and recommended the scheme for sanction.

SUBJECT NO. B-20

PHYSIOLOGY OF FLOWERING IN TROPICS EXTENSION—CALCUTTA UNIVERSITY

The Advisory Board endorsed the recommendation of the Botany Committee and recommended the extension proposals.

SUBJECT NO. B-21

BREEDING AND EVOLUTION OF RICE STRAINS RESISTANT TO PIRICULARIA DISEASE AND WORK ON SPRING RICE IN FLOODED AREAS OF COLLAIR, EXTENSION—ANDHRA

The Advisory Board endorsed the recommendations of the Eastern Regional Committee and the Botany Committee and recommended the extension proposals.

SUBJECT NO. B-22

STORAGE AND VIABILITY OF POLLEN GRAINS AND PHYSIOLOGY OF POLLEN TUBE GROWTH, EXTENSION—DELHI UNIVERSITY

The Advisory Board endorsed the recommendations of the Northern and temperate Regional Committees and Botany Committee and recommended the extension proposals.

SUBJECT NO. B-23

WHEAT RUST CONTROL SCHEME, EXTENSION—UTTAR PRADESH

The Advisory Board endorsed the recommendations of the Northern and Temperate Regional Committees and the Botany Committee and recommended the extension proposals.

SUBJECT NO. B-24

MULTIPLICATION AND DISTRIBUTION OF HYBRID BAJRA (CUMBU) SEEDS, EXTENSION—MADRAS

The Advisory Board endorsed the recommendations of the Botany Committee and recommended extension of the scheme on the existing basis for a period of two years only.

SUBJECT NO. B-25

CO-ORDINATED MAIZE BREEDING SCHEME—PROPOSAL FOR AMENDMENTS, NOTE—MADRAS

At the Advisory Board Dr. Uppal explained that this scheme had been prepared by a committee under the chairmanship of Dr. Pal. The country had been divided into four main regions and one main station would be located in each region. In this particular case, there had been a departure from the original proposal. Under the original plan, it had been decided that one of the main stations would be located in Kangra. The Rockefeller Foundation, which would be rendering the ncessary assistance, however. advised that one of the main stations should be located in Srinagar and that Kangra station should function as a sub-station. That was the only departure from the original plan. This work would be taken up by the Indian Council of Agricultural Research in collaboration with the Rockefeller Foundation. We are at a stage where we do not know which of the hybrid will be suitable and for which area. We want the production of a suitable hybrid to suit the particular soils obtaining in different parts of the country. Recently, a proposal had been considered for the production of hybrids on a commercial scale. It was envisaged in this proposal that one of the companies in America M/s. Funk Brothers Seed Co., Bloomington, Illionis, United States of America, would try to produce hybrid maize on a commercial scale in conjunction with some of our progressive growers. This was a difficult scheme in the sense that the seed which was to be grown had to be produced every year. If the work under this scheme was carefully and properly done there were great possibilities in that the production could be stepped up by 25 per cent.

The Chairman said that this was going to be one of the major Grow More Food measures.

The Advisory Board adopted the report.

SUBJECT NO. B-26

ADDITIONAL STAFF FOR NON-LODGING, NON-SHEDDING AND FLOOD RESISTANT VARIETIES OF PADDY, MADHYA PRADESH, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board endorsed the recommendation of the Botany Committee and recommended the additional staff asked for therein.

SUBJECT NO. B-27

REPORT OF THE SUB-COMMITTEE OF THE BOTANY COMMITTEE ON THE COLLECTION AND MAINTENANCE OF VARIETIES AND TYPES OF MILLETS GROWN IN INDIA—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The note was adopted.

SUBJECT NO. B-28

RECOMMENDATIONS MADE AT THE WHEAT RESEARCH WORKERS' CONFERENCE AND CROPS AND SOILS WING MEETING HELD AT SIMLA—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Vasudeva said that it had been recommended by the Wheat Research Workers' Conference that the work in connection with the recommendations made by it for the intensification of research on the genetic improvement of *Vulgare* and *durum* wheats in the plains and in the hills should be co-ordinated by a Sub-Committee of the Botany Committee. The subject matter relate mainly to the rusts and also to the pests. This would be beyond the scope of the Botany Sub-Committee. He, therefore, suggested that other experts should also be associated with this committee to look into this aspect of the work.

The recommendations made by the Wheat Research Workers Conference and the Crop and Soils Wing were adopted by the Advisory Board and the suggestion made by Dr. Vasudeva was also accepted by it. The Board desired that the recommendations should form the basis for future research work.

C.—AGRONOMY

SUBJECT NO. C-1

SURVEY AND IMPROVEMENT OF FODDER CROPS, NEW SCHEME—INSTITUTE OF PLANT INDUSTRY, INDORE

As there was already one centre at Bhopal under part two of the Grassland Research Scheme in the Malwa Region, the Advisory Board did not consider it necessary to have another centre for the same work at Indore. The scheme was, therefore, not recommended.

SUBJECT NO. C-2

SCHEME FOR CYTOGENETICS OF THE WILD GRASSES AND BREEDING THEM FOR SELECTION OF FODDER AND FORAGE GRASSES, NEW SCHEME——MADRAS

The Advisory Board recommended the scheme subject to the modification suggested by the Botany Committee.

SUBJECT NO. C-4

STUDY OF THE EFFECT OF IMPORTANT AGRONOMICAL PRACTICES ON JOWAR, NEW SCHEME—INSTITUTE OF PLANT INDUSTRY—INDORE

There was already a centre under the scheme of Model Agronomic experiments at Ujjain which included studies of the effect of agronomic practices on Jowar. It was realized that as Jowar was an important millet crop in the malwa Region, it should be included in the Co-ordinated Scheme of the Regional Millet Stations on cotton, oilseeds and millets in India. It was, therefore, suggested that the Madhya Pradesh Government should be requested to shift the centre at Ujjain under the Model Agronomic Experiments to Indore and that the Indore centre should be included as one of the Sub-Stations of the Regional Millet Stations under the Co-ordinated Millet Scheme

The scheme was, therefore, not recommended.

SUBJECT NO. C-8

WATER RELATIONS OF CROPS, NEW SCHEME—WEST BENGAL

In view of the fact that the work on water requirements of crops was being carried out as a part of the Model Agronomic Experiments Scheme and also because some fundamental work on water requirements was being done at the India Agricultural Research Institute.

New Delhi, and under an Indian Council of Agricultural Research scheme at the Agricultural Meteorological Section, Poona, the Advisory Board did not recommend the scheme.

SUBJECT NO. C-9

WATER REQUIREMENTS OF CROPS, NEW SCHEME—ANDHRA

As Andhra State had two centres under the Model Agronomic Experiments Scheme, one of which was located in the Tungabhadra area and as most of the work mentioned in the programme in this scheme had already been included in the programme under the Model Agronomic Experiments Scheme except sugarcane the Advisory Board did not recommend the scheme. The Board, however, noted that the studies on soil-moisture-plant relationship proposed in the scheme did not form part of the programme under Model Agronomic Experiments Scheme. It was, therefore, suggested that the State Government should prepare a small scheme to study this problem for the consideration of the Council.

Regarding sugarcane, it was noted that considerable knowledge was available from Padegaon and other research centres.

SUBJECT NO. C-10

WATER REQUIREMENTS OF CROPS, NEW SCHEME—AGRA COLLEGE

The Advisory Board did not approve of this scheme for the reasons given under subject No. C-8.

SUBJECT NO. C-11

GREEN MANURE, NEW SCHEME—UTTAR PRADESH

The Advisory Board approved of the scheme and recommended that it should be run as a part of the Co-ordinated Scheme on green manuring. The staff and contingent expenditure should be the same as approved for other centres under the Co-ordinated Scheme. The Board also recommended that the State Agronomist should also be associated with the operation of the scheme.

SUBJECT NO. C-12

NATURE AND EXTENT TO INTAKE OF DIFFERENT FORMS OF PHOSPHATES BY LEGUMINOUS GREEN MANURE CROPS, NEW SCHEME—MADRAS

The Advisory Board approved of the scheme with the following modifications as suggested by the Regional and Agronomy Committees:—

(i) Sulphur content of the plants should also be estimated in addition to the constituents mentioned in the scheme.

(ii) One of the Assistants proposed in the scheme should be a Microbiological Assistant.

(iii) One Laboratory Assistant in the grade of Rs. 45-2-55 should be added to the staff proposed.

(iv) The post of clerk proposed under the scheme should be deleted. The State Government should provide the clerk, if necessary.

(v) The expenditure should be shared on 50:50 basis as usual.

SUBJECT NO. C-13

SPRINKLER IRRIGATION, NEW SCHEME—MADRAS

In view of the fact that the Council had already sanctioned two schemes on sprinkler irrigation *viz.*, one at Poona and the other in Coorg and as it was proposed to carry out similar work in Himachal Pradesh, it was not considered necessary, at this stage, to have any more centres of work on this problem till sufficient data had become available from those schemes. The Board did not therefore, recommend this scheme.

SUBJECT NO. C-14

SPRINKLER IRRIGATION, NEW SCHEME—WEST BENGAL

For the reasons given under subject No. C-13, the Board did not recommend this scheme.

SUBJECT NO. C-16

STUDY OF WEEDS OF CROPS FIELDS OF EASTERN PARTS OF INDIA, NEW SCHEME,—WEST BENGAL

The Board felt that the work envisaged in the scheme should be undertaken by the State Government as a part of their general programme of work. The scheme was, therefore, not approved.

The Board, however, was of the view that if the scheme for the study of weeds would be prepared on a regional basis, the Council would consider it.

SUBJECT NO. C-17

WEED CONTROL, NEW SCHEME—WEST BENGAL

The Board approved of the scheme subject to the modification that the work envisaged under this scheme should form a part of the Co-ordinated Weed Control Scheme sanctioned by the Council.

SUBJECT NO. C-18

WEED CONTROL, NEW SCHEME—INSTITUTE OF PLANT INDUSTRY, INDORE

In view of the fact that a similar scheme had been sanctioned under the Co-ordinated Weed Control Scheme for Madhya Pradesh (Old Madhya Bharat) and Bhopal, the Advisory Board did not consider it necessary to have another centre at Indore. The Board did not, therefore, approve of the scheme.

SUBJECT NO. C-19

HYDROPONIC EXPERIMENTS, NEW SCHEME—UTTAR PRADESH

The Advisory Board did not approve of the scheme as recommended by the Regional and Scientific Committees. It was felt that sufficient work had already been done on this subject and that there were only limited possibilities for the practical application of this work. It was suggested that the crop physiologist of the State Government should take up this work as a part of his own programme of work.

SUBJECT NO. C-25

PHENOLOGICAL OBSERVATIONS, EXTENSION—METEOROLOGICAL DEPARTMENT

The Advisory Board agreed to the recommendation of the Agronomy Committee that the work already done under the scheme for the last 4½ years should be compiled before the proposal for the extension of the scheme could be considered. The Board, therefore, did not approve of the scheme.

SUBJECT NO. C-27

MANUFACTURE OF WEEDICIDES AT NATIONAL CHEMICAL LABORATORY, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Board approved of the decision of the Scientific Committee that as weedicides were available in the market, it was no longer necessary to manufacture them at the National Chemical Laboratory, Poona. It approved of the proposal to discontinue this work at the National Chemical Laboratory, Poona.

SUBJECT NO. C-28

CULTURAL STUDIES WITH UPLAND AUS PADDY, NEW SCHEME—WEST BENGAL

As the work on Aus Paddy was not included in the programme of the scheme of Model Agronomic Experiments, the Advisory Board recommended the scheme with the modifications regarding staff and expenditure as proposed by the Agronomy Committee. The Board also recommended the proposal that the recurring expenditure should be shared on a 50:50 basis and that the non-recurring expenditure should be met fully by the State Government.

D.—SOIL SCIENCE

SUBJECT NO. D-1

USE OF CARBONS IN RECLAMATION OF SOILS, NEW SCHEME —PUNJAB UNIVERSITY

The Advisory Board endorsed the recommendation of the Soil Science Committee that the work should be limited to only Laboratory studies, and that a detailed programme of work stating clearly as to how the studies were to be carried out should be presented and recommended the scheme for sanction.

SUBJECT NO. D-2

STANDARDISATION OF METHODS FOR DETERMINATION OF (I) SURFACE AREAS AND (II) PH VALUES. NEW SCHEME—PUNJAB UNIVERSITY

The scheme was recommended by the Advisory Board subject to the condition that the programme of work should be drawn up in consultation with Dr. A. N. Puri as a closely similar type of work formed a part of the programme already in progress under a scheme sanctioned under Dr. Puri at Bombay and that the two laboratories should be in close touch with each other in the execution of the programme.

SUBJECT NO. D-3

SCHEME FOR RESEARCH ON DEMINERLISATION OF WATER, NEW SCHEME—PUNJAB UNIVERSITY

The Board approved the scheme as recommended by the Scientific Committee with the modification that the work should be restricted to the demineralisation of water for irrigation purposes. The information available on a closely similar work on the problem of textile wastes by running over a bed of gypsum should be kept in view and the title of the scheme should be changed to "treatment of saline waters for irrigation purposes".

SUBJECT NO. D-4

FIXATION OF PHOSPHORUS AND POTASH. NEW SCHEME—PUNJAB

The scheme was approved in principle by the Advisory Board subject to the condition that the technical programme should be modified in the light of the programme that would be prepared by the Joint Model Agronomic Experiments Sub-Committee, proposed to be set up by the Soil Science Committee.

SUBJECT NO. D-5

FERTILITY INDEX AND PREDICTION OF CROP PRODUCTION, NEW SCHEME—BOMBAY (DR. A. N. PURI)

The Board approved of the scheme prepared by the Sub-Committee of the Soil Science Committee restricting the scope of the work to certain aspects which would elucidate the feasibility of the technique of determining the fertility index of soils. It also approved the recommendation of the Soil Science Committee that similar work should be repeated at the Indian Agricultural Research Institute, New Delhi for which a grant covering only the recurring expenditure should be made available to the Indian Agricultural Research Institute.

SUBJECT NO. D-6

INVESTIGATIONS ON KALLAR LANDS. NEW SCHEME—BOMBAY

The scheme was approved in principle by the Advisory Board with the modification that the scope of work should be restricted to the technical programme that would be prepared by the Sub-Committee proposed for appointment by the Soil Science Committee.

SUBJECT NO. D-7

CHEMICAL TISSUE TESTS AND LEAF ANALYSIS, NEW SCHEME —ANDHRA

As copies of the scheme were not available, it was not considered. As the subject was of all-India importance, the Board recommended that the Indian Council of Agricultural Research should prepare a model scheme on the use of tissue tests and leaf analysis as a means of diagonising nutrient requirements of crop plants.

SUBJECT NO. D-9

MICRO-NUTRIENT ELEMENT IN THE PHYSIOLOGY OF CROP PLANT WITH THE HELP OF RADIOACTIVE TRACERS. NEW SCHEME—WEST BENGAL

The scheme was not approved by the Advisory Board. As the work on micro-nutrients and radioactive tracers was already being carried out at the Indian Agricultural Research Institute. The Board, however, desired that the Indian Agricultural Research Institute should be requested to submit a scheme for taking up the work on similar lines.

SUBJECT NO. D-10

SURVEY OF ANTIBIOTIC PRODUCING MICRO-ORGANISMS FROM THE SOILS OF INDIA, NEW SCHEME—WEST BENGAL

The scheme was not approved by the Advisory Board as recommended by the Soil Science Committee.

SUBJECT NO. D-11

RECLAMATION OF SALINE SOILS, NEW SCHEME—WEST BENGAL

The scheme was approved in principle subject to the same modification as proposed in subject No. D-6.

SUBJECT NO. D-12

SOIL PLANT INTER-RELATIONSHIP WITH RESPECT TO UPTAKE OF MINOR ELEMENTS, NEW SCHEME—WEST BENGAL

As work of a similar type was already in progress at the Indian Agricultural Research Institute and also at the Bose Institute, Calcutta, the Advisory Board did not recommend the scheme.

SUBJECT NO. D-13

BIOLOGICAL APPROACH FOR THE RECLAMATION OF SOILS, NEW SCHEME—MADRAS

While recognising the need for study of this type of work the Advisory Board was of the view that it should form a part of the Co-ordinated programme of work that would be prepared by the Sub-Committee proposed under Subject No. D-6. The scheme was approved in principle by the Advisory Board.

SUBJECT NO. D-14

FOLIAR APPLICATION OF NUTRIENTS TO CROPS. NEW SCHEME—INDIAN AGRICULTURAL RESEARCH INSTITUTE

The Advisory Board approved the revised scheme prepared by the Soil Science Committee.

SUBJECT NO. D-15

SOIL STRUCTURE STUDIES, NEW SCHEME—PUNJAB

While approving the scheme in principle, the Advisory Board decided that a model plan of work should be prepared by the Sub-Committee, proposed to be set up by the Soil Science Committee and that the work under the Punjab Scheme should be revised on the lines of that model programme.

SUBJECT NO. D-16

STUDY OF ORGANIC MATTER OF MAJOR SOIL TYPES WITH REFERENCE TO CLAY HUMUS COMPLEXES AND CHELATE COMPOUNDS, NEW SCHEME—BANARAS HINDU UNIVERSITY

As the scheme was not likely to yield results of practical value, it was not recommended by the Advisory Board

SUBJECT NO. D-17

RESEARCH ON MICRO AND MICRO-NUTRIENT ELEMENT STUDIES IN USSR LANDS NEW SCHEME—LUCKNOW UNIVERSITY

The Advisory Board did not recommend the scheme as it was not drawn up on the lines suggested by the Indian Council of Agricultural Research.

SUBJECT NO. D-18

NITROGEN FIXATION OF LEGUMINOUS CROPS, NEW SCHEME—MADRAS

The scheme was approved by the Advisory Board.

SUBJECT NO. D-21

CHEMICAL INVESTIGATIONS OF THE CAUSE OF BLAST RESISTANCE IN PADDY, NEW SCHEME—MADRAS

The Advisory Board approved the scheme for sanction as recommended by the Scientific Committee.

SUBJECT NO. D-25

STUDY OF THE RATE OF DECOMPOSITION OF INSECTICIDAL DEPOSITS, NEW SCHEME—OSMANIA UNIVERSITY, HYDERABAD, DECCAN

The Advisory Board approved the scheme as the subject of the proposed study was important.

SUBJECT NO. D-25B

STUDIES OF NUTRITIVE VALUE OF DIFFERENT VARIETIES OF WHEAT AND STUDY OF PHYSIOLOGICAL CONDITION, NEW SCHEME—M.G.M. COLLEGE, INDORE

The Board did not approve the scheme as it was felt that it was not likely to provide much fresh information.

SUBJECT NO. D-25C

INVESTIGATION ON THE NUTRITIVE VALUE OF COMMON AND HYBRID INDIAN WHEATS, NEW SCHEME—INDIAN AGRICULTURAL RESEARCH INSTITUTE

While agreeing with the suggestion of the Soil Science Committee that the work should now form a part of the normal programme of the Indian Agricultural Research Institute, the Advisory Board did not approve the scheme.

SUBJECT NO. D-25D

SALINITY AND ALKALINITY CONTROL IN PUNJAB, NEW SCHEME—INDIAN AGRICULTURAL RESEARCH INSTITUTE

The scheme was approved in principle subject to the modification proposed under subject No. D-6.

SUBJECT NO. D-26

HUMIFICATION OF ORGANIC MATTER, EXTENSION—AGRA COLLEGE, AGRA

The extension of the scheme for a period of one year only was recommended by the Advisory Board with the proviso that a sum of Rs. 1,290 should be sanctioned towards the field work as proposed in the scheme.

SUBJECT NO. D-27

SOIL ANALYSIS STANDARDISATION, EXTENSION—BOMBAY (DR. A. N. PURI)

The Advisory Board recommended the extension of the scheme. It also endorsed the recommendation of the Soil Science Committee for instituting a Sub-Committee to keep it in close touch with the progress of the scheme and to make necessary suggestions from time to time.

SUBJECT NO. D-28

AMMONIUM SULPHATE TO PADDY LANDS, EXTENSION—WEST BENGAL

The Advisory Board approved the suggestion of the Scientific Committee that the experimental work should be continued as permanent manurial trials by the State Government and that the grant of Rs. 2,000 per annum might be made by the Council towards the contingent expenditure connected with the maintenance of the plots of the State Government. The extension asked for by the State Government was not approved.

SUBJECT NO. D-29

MICRO-NUTRIENT STATUS OF BOMBAY SOILS, EXTENSION —BOMBAY

The Advisory Board recommended the extension of the scheme for the period proposed.

SUBJECT NO. D-36

BIOLOGICAL NITROGEN FIXATION UNDER DIFFERENT INDIAN CONDITIONS WITH PARTICULAR REFERENCE TO ITS IMPORTANCE IN PRACTICAL AGRICULTURE, NOTE—DR. M. R. MADHOK, STATE BIO-CHEMIST, PUNJAB

The Board endorsed the recommendations of the Soil Science Committee and approved of the note prepared by Dr. Madhok on the subject. It also approved of the institution of a Sub-Committee to draw up a comprehensive programme of work to be initiated in different parts of the country as suggested by the Soil Science Committee.

E.—FLORICULTURE

SUBJECT NO. E-1

CYTOGENETICAL AND PHYSIOLOGICAL STUDIES IN RELATION TO FLORICULTURE. NEW SCHEME—INDIAN AGRICULTURAL RESEARCH INSTITUTE

The Advisory Board accepted the recommendation made by the Floriculture Committee that the scheme should be sanctioned subject to the modification that the work on Indian scented flowers should also be taken up at the Indian Agricultural Research Institute.

SUBJECT NO. E-2

CULTIVATION OF LOTUS, NEW SCHEME—UTTAR PRADESH

The Advisory Board accepted the recommendation of the Floriculture Committee to sanction the scheme, on a modified basis, and with the further proviso that the staff should actually be engaged only when the tanks were ready for further work.

SUBJECT NO. E-3

MULTIPLICATION OF ANNUAL FLOWER SEEDS, NEW SCHEME —UTTAR PRADESH

The Advisory Board recommended that the scheme should be revised as suggested by the Floriculture Committee.

SUBJECT NO. E-4

RESEARCH AND DEVELOPMENT OF FLORICULTURE NEW SCHEME—PEPSU/PUNJAB

Dr. Uppal said that it was intended to introduce the plant material from different parts of India and also from foreign countries. That would be a very useful type of work for the farmers who grew gardens and also for the Governments who had got gardens of their own.

The Chairman expressed the view that for the Eastern Region, a scheme from Assam would be very useful. He also invited the representives of Southern States to submit schemes for improving their gardens and for introducing tropical plants in the South.

The Advisory Board recommended the scheme for sanction subject to the modifications in the programme of work as proposed by the Floriculture Committee.

F.—FRUITS

SUBJECT NO. F-1

RESEARCH ON CASHEWNUT, NEW SCHEME—WEST BENGAL

The Advisory Board observed that research on cashewnuts was already going on in the major cashewnut growing States of India and that no further research work need be taken up in West Bengal. In the circumstances, the recommendations of the Eastern Regional Committee and the Horticulture Committee in favour of the scheme were not agreed to by the Advisory Board.

SUBJECT NO. F-2

BANANA RESEARCH STATION, NEW SCHEME—ANDHRA

The Advisory Board accepted the recommendation of the Horticulture Committee to sanction the scheme subject to the modifications suggested by it in respect of technical programme as well as the expenditure.

SUBJECT NO. F-3

CYTOGENETICAL STUDIES ON GRAPES AND WILD SPICES, NEW SCHEME—MADRAS

The Advisory Board accepted the recommendation of the Horticulture Committee to sanction the scheme with the proviso that the State Government should meet the entire non-recurring cost including the purchase of microscope, etc.

SUBJECT NO. F-5

IMPROVEMENT OF PINE-APPLE BY APPLICATION OF GROWTH REGULATING SUBSTANCES, NEW SCHEME—GAUHATI UNIVERSITY

The Advisory Board agreed with the suggestion made by the Horticulture Committee and recommended the scheme for sanction.

SUBJECT NO. F-6

INVESTIGATION OF ROOT ROT, LIMBS BREAKAGE AND DEFICIENCY DISEASES OF CITRUS, NEW SCHEME—ANDHRA

The Advisory Board endorsed the recommendations of the Plant Diseases and Horticulture Committees with regard to the modifications in the technical programme of this scheme and in the staff and other expenditure proposed by them and recommended the scheme for sanction.

SUBJECT NO. F-7

TRAINING IN FRUIT PRESERVATION, NEW SCHEME—ANDHRA

The Advisory Board approved the scheme on the lines proposed by the Horticulture Committee.

SUBJECT NO. F-9

COLLECTION OF BANANA VARIETIES, NEW SCHEME—MADRAS

The Advisory Board accepted the recommendation made by the Horticulture Committee that this scheme should not be treated as a new scheme but the work should be augmented to the extent possible with the funds already sanctioned for the Central Banana research station.

SUBJECT NO. F-10

CONTROLLING OF FRUIT DISEASES IN AURANGABAD NEW SCHEME—HYDERABAD

The Advisory Board accepted the recommendations of the Plant Diseases and Horticulture Committees and did not approve the scheme.

SUBJECT NO. F-11

ENZYMIC PROCESS IN THE GERMINATION OF MANGO SEEDS, NEW SCHEME—LUCKNOW UNIVERSITY

The Advisory Board accepted the recommendations of the Scientific Committee that the scheme should be re-drafted and put up next year.

SUBJECT NO. F-12

ASSESSMENT OF VARIABILITY IN HORTICULTURAL MATERIAL WITH A VIEW TO REDUCE IT. NEW SCHEME—COORG

The Advisory Board endorsed the recommendations of the Horticulture Committee and did not approve the scheme.

SUBJECT NO. F-13

INVESTIGATION ON TWIG-BLIGHT DISEASES OF ORANGE. NEW SCHEME—WEST BENGAL

The Advisory Board approved the scheme subject to the modifications suggested by the Plant Diseases and Horticulture Committees.

SUBJECT NO. F-14

RESEARCH ON CITRUS FRUIT. NEW SCHEME—WEST BENGAL

The Advisory Board agreed with the recommendations made by the Horticulture Committee and did not approve the scheme.

SUBJECT NO. F-15

INVESTIGATION ON DISEASES OF BANANA, NEW SCHEME—WEST BENGAL

The Advisory Board accepted the recommendations of the Eastern Regional Committee and the Scientific Committees and did not approve the scheme in its present form.

SUBJECT NO. F-16

RESEARCH ON PINE-APPLE, NEW SCHEME—WEST BENGAL

The Advisory Board approved the scheme subject to the modifications suggested by the Horticulture Committee.

SUBJECT NO. F-18

INTENSIFICATION OF RESEARCH ON MANGO, NEW SCHEME—WEST BENGAL

The Advisory Board approved the scheme subject to the modifications suggested by the Horticulture Committee.

SUBJECT NO. F-19

INTENSIFICATION OF RESEARCH ON MANGO AND CITRUS, EXTENSION—ORISSA

The Advisory Board approved the scheme subject to the modifications made by the Horticulture Committee.

SUBJECT NO. F-20

INTENSIFICATION OF RESEARCH ON PINE-APPLE, NEW SCHEME—ASSAM

The Advisory Board approved the scheme subject to the modifications suggested by the Horticulture Committee.

SUBJECT NO. F-22

FRUIT RESEARCH, EXTENSION—ORISSA

The Advisory Board agreed to the extension of this scheme for one year provided extension was recommended by the Horticulture Committee at its spring meeting to be held in February, 1957.

SUBJECT NO. F-23

BANANA RESEARCH STATION, EXTENSION—MADRAS

As regards the reason for not shifting the present site of the more station at Aduthurai to some other area not subject to cyclones, Shri Sundaram, Director of Agriculture, Madras said that when he was the Director of Agriculture in Madras some eight years ago, he took a lot of personal interest in locating this station at Aduthurai. In fact, he went and begged the Head of a Mutt there to give him the land which was very fertile and valuable. He contended that just because there were two cyclones in the course of 2 to 3 years it should not be concluded that Aduthurai was situated in the cyclonic belt and that it was very unsuitable. A cyclone after all could affect any area. In fact, Trichy was also affected in both the cyclones. Shri Sundaram strongly pleaded that the station should remain at Aduthurai itself.

The Advisory Board approved the extension proposal subject to the suggestion made by the Horticulture Committee. It also agreed with the proposal made by the State Director of Agriculture that there was no necessary to change the site of the research station and that work on the present site at Aduthurai should continue.

SUBJECT NO. F-24

RESEARCH ON CASHEWNUT, EXTENSION—TRAVANCORE COCHIN

The Advisory Board agreed to the extension to this scheme for one year provided extension was recommended by the Horticulture Committee at its meeting to be held in February, 1957.

SUBJECT NO. F-25

CO-ORDINATED SCHEME FOR THE PRESERVATION AND STORAGE OF FRUITS BY THE USE OF HORMONES AND CHEMICALS, EXTENSION—CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE

The Advisory Board agreed with all the recommendations of the Horticulture Committee and recommended extension of the scheme for another year at three centres.

SUBJECT NO. F-26

RESEARCH ON PESTS AND DISEASES AFFECTING CASHEWNUT PLANTATIONS, EXTENSION—MADRAS

The Advisory Board accepted the recommendation made by the Scientific Committees.

SUBJECT NO. F-27

MICRO-NUTRIENTS, EXTENSION—COORG

The Advisory Board endorsed the recommendations made by the Horticulture Committee for sanctioning the additional grant for the working of the scheme in Coorg.

SUBJECT NO. F-30

CONSTRUCTION OF BUILDING AT PASHULOK (U.P.) UNDER THE HORTICULTURAL PLANT INTRODUCTION SCHEME, EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board accepted the recommendation made by the Horticulture Committee that the expenditure on the construction of buildings at Pashulok for residential accommodation should be met by the Indian Council of Agricultural Research.

SUBJECT NO. F-31

UNIFIED CONTROL OF FRUIT RESEARCH SCHEMES IN HIMACHAL PRADESH, EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The proposal made by the Indian Council of Agricultural Research was approved by the Advisory Board.

SUBJECT NO. F-32

REQUISITION FOR THE SERVICES OF AN ITALIAN EXPERT ON HORTICULTURE, EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

While explaining the scheme, Dr. Uppal said that there was a proposal to requisition the services of an Expert from a Mediterranean country for consultation regarding sub-tropical and temperate region horticulture. The selection of the Expert would of course be made in consultation with the Food and Agricultural Organisation experts.

SUBJECT NO. F-35

REPORT OF THE SUB-COMMITTEE OF THE HORTICULTURE COMMITTEE REGARDING THE ESTABLISHMENT OF REGIONAL STATIONS FOR INTENSIFICATION OF RESEARCH ON IMPORTANT FRUITS, EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Uppal said that the scheme was discussed at very great length by the Horticulture Committee. It was recommended that the country should be divided into five main regions and each region should have an important station which would be subsidised by the Indian Council of Agricultural Research. The intention was to strengthen one important reserach station in a region. The State Governments would continue to contribute their own share for the running of the station *i.e.*, land, staff, etc. The Indian Council of Agricultural Research will augment these resources. Due to the varied nature of the problems and the larger number of fruits to be tackled suitable number of sub-stations would also be established.

The Scheme as proposed by the Horticulture Committee was recommended by the Advisory Board to the Governing Body for approval.

SUBJECT NO. F-48

IDENTIFICATION AND DEVISING OF CONTROL MEASURES FOR SERIOUS DISEASES IN GUAVA, EXTENSION—AJMER

The Advisory Board agreed to the extension of this scheme for one year on the condition that the extension proposal was recommended by the Horticulture Committee at its spring meeting.

SUBJECT NO. F-49

ESTABLISHMENT OF SUB-HUMID TROPICAL HORTICULTURAL RESEARCH STATION ON TRIPATHI HILLS, EXTENSION—ANDHRA

The Advisory Board agreed with the recommendation of the Horticulture Committee that the scheme should be revised on the lines suggested by it.

SUBJECT NO. F-52

CITRUS FRUIT RESEARCH, EXTENSION—BOMBAY

The Advisory Board agreed to one year's extension to this scheme provided the Horticulture Committee recommended the extension at its meeting to be held in February, 1957.

G.—VEGETABLES

SUBJECT NO. G-1

ONION RESEARCH, NEW SCHEME—ANDHRA

The Advisory Board recommended the scheme subject to the modifications suggested by the Horticulture Committee.

SUBJECT NO. G-2

IMPROVEMENT OF ONION AND GARLIC, NEW SCHEME—WEST BENGAL

The Advisory Board recommended the scheme subject to the modifications suggested by the Horticulture Committee.

SUBJECT NO. G-3

CULTIVATION OF MUSHROOM, NEW SCHEME—HIMACHAL PRADESH

The Advisory Board accepted the recommendation made by the Horticulture Committee that the State Government should arrange to train one of their officers in Europe before a scheme of this nature could be started.

SUBJECT NO. G-4

INTERGENETIC, INTERSPECIFIC AND INTERVARIETAL HYBRIDIZATION IN CUCURBITS AND SOLANCEOUS CROP PLANTS, NEW SCHEME—CALCUTTA UNIVERSITY

The Advisory Board accepted the recommendation of the Horticulture Committee and did not approve the scheme.

SUBJECT NO. G-5

VEGETABLES, NEW SCHEME—ANDHRA

Dr. Uppal explained the recommendations of the Southern Regional Committee and the Horticulture Committee and said that this scheme was discussed in detail by the latter Committee but was not recommended for sanction as there was already a vegetable research station functioning in the State with headquarters at Hyderabad and a separate research station for vegetables was not considered necessary.

The Director of Agriculture, Andhra replied that the scheme was considered very important by the State Government and they had already approved it and also agreed to share its cost, despite deficit budget of the State. He, therefore, urged the Board to reconsider the matter.

The Chairman said that as the State Government had provided the cost for the scheme in their budget, it might be approved.

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. G-6

IMPROVEMENT OF ROOT CROPS, NEW SCHEME—WEST BENGAL

The Advisory Board approved the scheme on the lines suggested by the Horticulture Committee.

SUBJECT NO. G-7

CO-ORDINATED SCHEME FOR RESEARCH ON SWEET POTATO AND TAPIOCA, EXTENSION—TRAVANCORE-COCHIN

The Advisory Board approved the scheme subject to the modifications made by the Horticulture Committee.

SUBJECT NO. G-8

TUBER CROPS, EXTENSION—BIHAR

The Advisory Board recommended the extension proposal subject to the modifications suggested by the Horticulture Committee.

H.—SPICES & MISCELLANEOUS CROPS

SUBJECT NO. H-1

CARDAMOM RESEARCH, NEW SCHEME—COORG

The Advisory Board endorsed the recommendation of the Horticulture Committee and the Botany Committee and did not recommend this scheme for sanction as it was felt that it was not necessary to consider a separate scheme for the same State.

SUBJECT NO. H-2

PAN RESEARCH, NEW SCHEME—UTTAR PRADESH

The Advisory Board recommended the scheme for sanction subject to the modifications suggested by the Horticulture Committee.

SUBJECT NO. H-3

PAN RESEARCH, NEW SCHEME—MADRAS

The Advisory Board recommended the scheme for sanction subject to the modifications suggested by the Horticulture Committee.

SUBJECT NO. H-4

IMPROVEMENT OF LEMON GRASS. NEW SCHEME—TRAVANCORE-COCHIN

The Advisory Board endorsed the recommendations of the Horticulture Committee and the Botany Committee and recommended the scheme for sanction.

SUBJECT NO. H-5

RESEARCH ON PEPPER AND CARDAMOM, NEW SCHEME—ORISSA

The scheme was approved for sanction on the lines suggested by the Horticulture Committee.

SUBJECT NO. H-6

IMPROVEMENT OF SPICES, NEW SCHEME—DELHI UNIVERSITY

The scheme was approved by the Advisory Board subject to the observations made by the Botany Committee.

SUBJECT NO. H-7

REGIONAL IMPROVEMENT OF CHILLIES, NEW SCHEME—ANDHRA

The Advisory Board did not approve the scheme in its present form.

SUBJECT NO. H-8

RESEARCH ON CORIANDER, NEW SCHEME—MADRAS

The Advisory Board endorsed the recommendations of the Scientific Committees and did not recommend the scheme for sanction.

SUBJECT NO. H-9

ADDITIONAL STAFF FOR THE ESTABLISHMENT OF A RESEARCH STATION FOR THE SPICES PLANT INTRODUCTION WORK IN WYNAD, NEW SCHEME—MADRAS

The Advisory Board endorsed the recommendations of the Scientific Committees and did not recommend the scheme for sanction

SUBJECT NO. H-10

TURMERIC RESEARCH, NEW SCHEME—WEST BENGAL

Dr. Uppal said that this scheme was not approved by the Eastern Regional Committee and the Horticulture Commitee as they felt that a lot of work on turmeric had already been done in the neighbouring State of Orissa and that the Government of West Bengal should look to that State. Moreover, the area under turmeric in Bengal was very small.

The Advisory Board did not recommend the scheme for sanction.

SUBJECT NO. H-11

PAN RESEARCH, NEW SCHEME—MADHYA PRADESH

The scheme was approved for sanction subject to the observations made by the Horticulture Committee.

SUBJECT NO. H-13

TURMERIC RESEARCH SCHEME, NEW SCHEME—ORISSA ..

The Advisory Board endorsed the recommendation of the Horticulture Committee and did not approve the Scheme.

SUBJECT NO. H-14

SPICES AND CASHEWNUT SHOWS, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The scheme was approved.

SUBJECT NO. H-15

RESEARCH ON COCOA, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board endorsed recommendations of the Horticulture Committee and approved of the note as it was considered of national importance.

SUBJECT NO. H-16

CHILLIES RESEARCH, EXTENSION—ANDHRA

The Advisory Board endorsed recommendations of the Horticulculture Committee, and the Botany Committee and agreed to the extension proposals.

I.—MEDICINAL PLANTS

SUBJECT NO. I-1

POSSIBILITIES OF THE CULTIVATION OF CINNAMUM CAMPHORA IN WYNAD, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board was of the view that the author of the scheme should revise it on the lines of the proforma of the Indian Council of Agricultural Research and submit the revised proposals.

SUBJECT NO. I-3

MEDICINAL PLANTS, EXTENSION—FOREST RESEARCH INSTITUTE, DEHRA DUN

The Advisory Board approved the extension proposal.

SUBJECT NO. I-4

MEDICINAL PLANTS, EXTENSION—ASSAM

The Advisory Board agreed to the extension of the scheme for one year provided that the Medicinal Plants Committee recommended the extension at its meeting to be held in February, 1957.

SUBJECT NO. I-5

ERGOT, EXTENSION—WEST BENGAL

The Advisory Board recommended the extension subject to the observations made by the Plant Diseases Committee.

J.—ENTOMOLOGY

SUBJECT NO. J-1

STUDY OF THE RATE OF DECOMPOSITION OF INSECTICIDAL DEPOSITS, NEW SCHEME—OSMANIA UNIVERSITY

The Advisory Board endorsed the recommendations of the Scientific Committees and recommended the scheme for sanction.

SUBJECT NO. J-2

BIO-ASSAY OF INDIGENOUS PLANTS INSECTICIDES, NEW SCHEME—UTTAR PRADESH

The Advisory Board endorsed the recommendations of the Scientific Committees and did not recommend the scheme.

SUBJECT NO. J-3

RESEARCH AND INVESTIGATION ON BEL WORM PEST IN CROPS, NEW SCHEME—UTTAR PRADESH

The Advisory Board endorsed the recommendations of the Scientific Committees and did not recommend the scheme for sanction.

SUBJECT NO. J-4

BUILDING UP NAMED REFERENCE COLLECTIONS OF INSECT PESTS—AGRICULTURAL COLLEGE, BAPATLA, NEW SCHEME —ANDHRA

While explaining the recommendations of the Scientific Committees, Dr. Uppal said that last year a similar scheme was sanctioned for Madras, as that State had got first class entomological collections. The Andhra Government had come forward for a similar scheme. The Committees were of the view that this should form part of the normal duties of the State Entomologist.

The Director of Agriculture, Andhra, replied that, although Andhra State was not very well off financially, yet that Government had sanctioned this scheme and agreement to bear the cost on usual 50:50 basis. In the circumstances the Advisory Board recommended the scheme for sanction.

SUBJECT NO. J-5

STUDIES IN SECURING THE HELP OF NATURAL ENEMIES OF INSECT PESTS, NEW SCHEME—ANDHRA

The Board endorsed the recommendations of the Southern and Coastal Regional Committee and the Entomology and Animal Pests of Crop Committee and did not recommend the scheme for sanction.

SUBJECT NO. J-6

SURVEY, STUDY AND CONTROL OF SOIL INHABITING INSECTS HARMFUL TO AGRICULTURAL AND HORTICULTURAL CROPS, NEW SCHEME—UTTAR PRADESH

The Advisory Board endorsed the recommendations of the Eastern Regional Committee and the Entomology and Animal Pests of Crops Committee and did not recommend the scheme.

SUBJECT NO. J-7

TERMITE RESEARCH (CONTROL), NEW SCHEME—FOREST RESEARCH INSTITUTE, DEHRA DUN

The Advisory Board endorsed the recommendations of the Scientific Committees and did not recommend the scheme for sanction.

SUBJECT NO. J-8

INVESTIGATIONS ON THE NATURE AND EXTENT OF DAMAGE BY SUCKING INSECTS, NEW SCHEME—PUNJAB UNIVERSITY

The Advisory Board endorsed the recommendations of the Northern and Temperate Regional Committees and the Entomology and Animal Pests of Crops Committee, and did not recommend the scheme for sanction.

SUBJECT NO. J-9

STUDIES ON THE SOIL FAUNA, NEW SCHEME—PUNJAB UNIVERSITY

The Advisory Board endorsed the recommendations of the Scientific Committees and did not recommend it for sanction.

SUBJECT NO. J-10

RESEARCH ON SOIL FAUNA PARTICULARLY INSECTS, NEW SCHEME—SHRI K. D. BAWEJA

The Board endorsed the recommendations of the Scientific Committees and not recommend the scheme for sanction.

SUBJECT NO. J-11

STUDIES ON THE APHIDES, NEW SCHEME—WEST BENGAL

The Advisory Board endorsed the recommendations of the Scientific Committees and did not recommend it for sanction.

SUBJECT NO. J-12

RESEARCH ON THE TOXICOLOGY AND ADVERSE EFFECTS OF SYNTHETIC PESTICIDES, NEW SCHEME—MADRAS.

The Advisory Board endorsed the recommendations of the Southern and Coastal Regional Committees and the Entomology and Animal Pests of Crops Committee and did not recommend the scheme for sanction.

SUBJECT NO. J-14

FUNDAMENTAL RESEARCH ON THE TOXICITY AND MODE OF ACTION OF INSECTICIDES, NEW SCHEME—PUNJAB UNIVERSITY

The Advisory Board endorsed the recommendations made by the Northern Regional Committee held in 1955 and that of the Entomology and Animal Pests of Crops Committee and recommended the scheme for sanction.

SUBJECT NO. J-17

RESEARCH ON THE JOWAR SHOOT-CATERPILLAR AND JOWAR SHOOTBUG IN MALWA REGION, NEW SCHEME—MADHYA BHARAT

The Advisory Board endorsed the recommendations of the Entomology Committee and did not recommend the scheme for sanction.

SUBJECT NO. J-19A

PADDY AGROMYZID FLY, EXTENSION—HYDERABAD

In view of the very small amount involved under the extension proposals, the Advisory Board recommended its extension upto December 1957.

K.—MYCOLOGY

SUBJECT NO. K-1

BIO-ASSAY AND OTHER TECHNIQUES IN THE STUDY OF PLANT DISEASES, NEW SCHEME—MADRAS UNIVERSITY

The Advisory Board recommended the scheme for sanction subject to the remarks made by the Plant Diseases Committee.

SUBJECT NO. K-2

RESEARCH ON FUNGICIDES, NEW SCHEME—INDIAN AGRICULTURAL RESEARCH, INSTITUTE

The Advisory Board agreed to the sanction of the scheme in the modified form as suggested by the Plant Diseases Committee.

SUBJECT NO. K-7

WILT DISEASES OF MAIZE, NEW SCHEME—BIHAR

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. K-13

INVESTIGATION OF RUST AND DOWNY MILDEW DISEASES OF SORGHUM AND BAJRA AND TENAI AND BLAST DISEASE OF RAGI, NEW SCHEME—MADRAS

Dr. Uppal explained that the work envisaged in this scheme would be taken up under the co-ordinated scheme when the Research Station would be established, and that there was no need of sanctioning a special scheme.

The Advisory Board did not recommend the scheme for sanction.

SUBJECT NO. K-14

MAJOR DISEASES OF BARLEY, NEW SCHEME—WEST BENGAL

The Advisory Board endorsed the recommendations of the Eastern Regional Committee and the Plant Diseases Committee and did not recommend the scheme.

SUBJECT NO. K-16

ZIRA RESEARCH, EXTENSION—RAJASTHAN

The Advisory Board recommended the extension of the scheme subject to the observations made by the Botany Committee.

SUBJECT NO. K-18

BLAST DISEASE OF RICE AND FOOT ROT OF WHEAT EXTENSION—BOMBAY

The Advisory Board recommended the extension subject to the observations made by the Plant Diseases Committee.

L.—AGRICULTURAL IMPLEMENTS

SUBJECT NO. L-1

PRODUCTION, DEMONSTRATION, TRIAL, ETC., OF IMPROVED AGRICULTURAL IMPLEMENTS, EXTENSION—INDIAN AGRICULTURAL RESEARCH INSTITUTE

Shri Bishan Man Singh suggested that bodies such as All India Farmers' Forum should be consulted about the farmer's requirements of implements. He suggested that manufacture of improved Seed Drill and Waterlifts should be taken up.

Dr. Uppal, however, explained that they had recommended that each State Government should set up Agricultural Implements Committee with which should be associated the State Agricultural Officers and also the manufacturers of implements, and that it was for that Committee to put up proposals for tackling any problem about implements. Regarding improvement of Seed Drills Dr. Uppal informed the members that work in this direction has already been taken up in another area.

The Advisory Board recommended the extension of the scheme.

M.—ANIMAL BREEDING

(a) CATTLE

SUBJECT NO. M-1

INVESTIGATIONS ON THE PROGENY TESTING OF BULLS UNDER INDIAN CONDITIONS, NEW SCHEME—CO-ORDINATED SCHEME, INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Bhattacharya explained that it was a co-ordinated scheme. At the Eastern Regional Committee meeting, it was suggested that, in addition to the Hariana breed in the model scheme, work on buffalo should also be taken up. The Temperate Regional Committee suggested that Kankrej breed should also be taken up. The Animal Breeding Committee felt that since this was a pilot scheme, the work on Hariana and Kankrej only might be taken up at first. It was also suggested to set up a separate bull station for Kankrej breed at Anand.

The Director of Agriculture, Assam suggested that the Ongole breed might also be added, as that had become a world famous breed.

Dr. Bhattacharya replied that the scheme under consideration was not a scheme for the multiplication of breeds. It was only a scheme for evolving a suitable method at progeny testing under Indian conditions. If the work were carried out on one breed that should suffice, but the Animal Breeding Committee thought that, in addition to Hariana, work might be taken up on Kankrej also.

The Advisory Board endorsed the recommendation of the Animal Breeding Committee and recommended the scheme for sanction.

SUBJECT NO. M-2

DETERMINATION OF THE AGE OF MATURITY IN INDIAN BULLS, NEW SCHEME—ORISSA

Dr. Bhattacharya explained that the State Government was requested to revise the original scheme. The revised scheme which included study on the Hariana breed was recommended by the Animal Breeding Committee.

The Advisory Board endorsed the recommendations of the Animal Breeding Committee.

SUBJECT NO. M-3

EVOLUTION OF A NEW BREED OF DAIRY CATTLE BY CROSSING HARIANA COWS WITH JERSEY BULLS, NEW SCHEME —WEST BENGAL

Dr. Bhattacharya said that the scheme envisaged evolution of a new breed for high milk yield. At the last Animal Breeding Committee meeting, it was pointed out that there should be no objection to using distinct indigenous breeds for evolution of a new breed by cross with exotic breeds. The scheme as it came from Bengal suggested taking up 100 Hariana cows but both the Cross-breeding Committee and the Animal Breeding Committee thought that, with a view to getting useful results at least 200 indigenous cows and 10 bulls should be taken up. If this recommendation were approved, the cost of the scheme would increase from about Rs. 8 lakhs to about Rs. 16 lakhs.

Shri Bishan Man Singh said that considerable work has been done in the past, on cross-breeding of Desi cows with foreign blood and Dr. Wright who had given a detailed account thereof in his report was quite against that practice.

Dr. Sikka replied that the views expressed by Dr. Wright were taken into account while the scheme was considered by the Cross-breeding Committee and Animal Breeding Committee. No doubt, a lot of cross-breeding had been done, particularly at the Military Dairy Farms, at the Indian Agricultural Research Institute and at the National Dairy Research Institute but the work had largely been confined in the past to mating of a foreign bull with an Indian cow and then going on to the second generation, *i.e.*, 75% European or exotic and 25% Indian. Past experience had shown that as the exotic blood increased the animal got out of equilibrium with its environment and its constitution suffered. The intention under this scheme was not, however, to carry out work in that manner but instead to mate *inter se* cross-breed in order to get a new breed—a breed which would be in equilibrium with its environment. Work on that had not been done on any large scale in the past and therefore the country had nothing by way of good cross-bred animals.

Shri Gill said that the crossing of double purpose animals was proposed in the scheme and that was against the accepted breeding policy of the country, but, as an experimental measure, this could be undertaken. It was not, however understood what kind of cattle was proposed to be evolved—a dairy cattle, a dual purpose cattle or a draught cattle and for which part of the country that would be useful.

Dr. Sikka replied that the intention was to evolve a dairy type of animal as would be clear from the title of the scheme "Evolution of a new breed of dairy cattle by crossing Hariana cows with Jersey Bulls". That was particularly useful for an area which had a high rainfall. The scheme was not, therefore, against the accepted breeding policy of the country. Hariana breed had been selected for the purpose because experience of cross-breeding at the Military Farms had shown that Hariana had given the best results since it had a better constitution. Hariana was used in the eastern part of the country and had been found suitable there. Moreover, there was hardly an exotic breed which had not been tried at one stage or the other in India.

In reply to a query from some other member as to why some other breed famous for higher milk yield, instead of Jersey should not be used. Dr. Bhattacharya explained that that point was discussed at length at the Animal Breeding Committee meeting and also at the Cross-breeding Committee meeting and ultimately it was decided to have Jersey because of another important point in that that breed was very much heat tolerant as compared to others.

Dr. Sikka added that so far as the Red Sindhi was concerned, the average yield of the animal at the Bangalore Institute was only 4,000 lbs. of milk. When a breed like jersey would be used the chances for introduction were much more. In reply to the query from the Vice-President as to why the Red Sindhi was not considered as suitable as Hariana breed. Dr. Sikka replied that the Red Sindhi, when tried in Bengal, was not found to be satisfactory. It had not got the same constitution as Hariana to stand up to the climate. The Board endorsed the recommendation of the Cross-breeding and Animal Breeding Committees.

SUBJECT NO. M-4

CROSS-BREEDING OF CATTLE WITH HOLSTEIN BULLS, NEW SCHEME—ANDHRA

Dr. Bhattacharya said that the Cross-breeding Committee recommended the scheme but it was considered desirable by it to try jersey instead of the Holstein breed because the expenses in buying the bulls could be avoided. That Committee did not, however, object, in principle, to the use of the other breeds, if the Andhra Government could find money for buying the bulls themselves. The Animal Breeding Committee endorsed the recommendation of the Crossbreeding Committee but was strongly of the opinion that in consideration of the soil and other agricultural conditions of that area, jersey should be used.

Shri Bhagwan Das, Director of Animal Husbandry, Andhra Pradesh said that if jersey was preferred only because of considerations other than finance, he had nothing to say, but if jersey was preferred on financial considerations, that did not seem to be a correct way of putting things, although he was not a technical man.

Dr. Bhattacharya replied that jersey was considered suitable by the Animal Breeding Committee on grounds other than finance. The recommendation of the Animal Breeding Committee was agreed to by the Advisory Board.

SUBJECT NO. M-5

IMPROVEMENT IN MILK PRODUCTION OF INDIGENOUS CATTLE BY CROSS-BREEDING WITH JERSEY, NEW SCHEME—NASIK (BOMBAY)

The Advisory Board agreed to the recommendation of the Crossbreeding Committee which was endorsed by the Animal Breeding Committee.

SUBJECT NO. M-6

PURCHASE OF FOUR JERSEY BULLS FOR THE CENTRAL ARTIFICIAL INSEMINATION STATION, BANGALORE, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

In view of the expension programme envisaged the necessity for having four more bulls was recognized by the Advisory Board and the proposal was approved.

SUBJECT NO. M-7

THICKNESS OF SKIN AND DISTRIBUTION OF SWEAT GLANDS OF BUFFALOES IN RELATION TO MILK PRODUCTION, NEW SCHEME—INDIAN VETERINARY RESEARCH INSTITUTE/PUNJAB

The Advisory Board agreed with the Animal Breeding Committee that (a) the scheme should be worked for the present, only at the Indian Veterinary Research Institute and at least one popular breed of cattle and one of buffaloes should be studied, and (b) the consideration of the Punjab scheme should be postponed until the technique had been standardized at the Indian Veterinary Research Institute.

SUBJECT NO. M-8

POSSIBILITY OF SPREADING OUT THE BREEDING SEASON OF BUFFALOES, NEW SCHEME—INDIAN VETERINARY RESEARCH INSTITUTE

The Advisory Board endorsed the recommendation of the Animal Breeding Committee and recommended the scheme.

SUBJECT NO. M-9

COMPARATIVE VALUE OF SELECTIVE BREEDING VERSUS GRADING UP OF UMBLACHERRY CATTLE, NEW SCHEME—MADRAS

The Advisory Board agreed with the recommendation of the Animal Breeding Committee.

SUBJECT NO. M-10

COMPARATIVE VALUE OF GRADING UP WITH SINDHI AND CROSS-BREEDING WITH JERSEY, NEW SCHEME—TRAVANCORE-COCHIN

The Advisory Board endorsed the recommendations of the Animal Breeding Committee and recommended the scheme for approval by the Governing Body.

SUBJECT NO. M-11

SCHEME TO SUPPLEMENT LIVESTOCK INVESTIGATION, EXTENSION—HISSAR (PUNJAB)

Dr. Bhattacharya said that the scheme had been running in the Punjab since 1943. At the last meeting of the Advisory Board, it was suggested that an *ad hoc* Committee should visit Hissar to make an on-the-spot examination of the scheme and to report on the progress of work. The *ad hoc* Committee visited the place in April last and was of the opinion that a stage had been reached when the scheme should be taken over by the State Government. The State Director of Animal Husbandry, however, explained certain difficulties in taking over the scheme immediately. The extension of the scheme was, therefore, recommended by the Animal Breeding Committee subject to the following conditions:—

(a) The extension should be granted on the distinct understanding that on the expiry of the extension period, the scheme would be taken over by the State Government and the work continued by them and

(b) (i) As the present Class I Officer in charge of the scheme who had been holding the post for the last few years had been selected for appointment to another Indian Council of Agricultural Research scheme in the same place, the post of Class I Officer should be held in abeyance for the duration of the scheme and a Class II Officer appointed instead, and

(ii) The present Class I Officer should be placed in overall charge of both the schemes and the Class II Officer should assist him in the work of this scheme.

This was accepted by the Director of Animal Husbandry of the State.

The Advisory Board recommended the extension of the scheme on the above lines.

SUBJECT NO. M-12

INFLUENCE OF THE SYSTEM OF REARING ON SEX BEHAVIOUR OF BREEDING BULLS, NEW SCHEME—CO-ORDINATED SCHEME, INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Bhattacharya said that this was a co-ordinated scheme for investigation on the influence of different systems of rearing on sex behaviour of breeding of bulls. The Food and Agriculture Organization expert, Professor Lafgerloff was of the opinion that the lethargy of the Indian bull might be due to the system of rearing. He, therefore, suggested that a study be taken up to find out how far the system of rearing was responsible for the low serviceability of the Indian bull. A scheme had been prepared according to the ideas given by him and it was to be taken up in six centres.

One member said that this was probably due to the fact that Indian bulls were over-worked while another member expressed the view that climatic and feeding conditions might also affect the bulls adversely.

Dr. Sikka replied that he had a very large herd of Hariana breed at Haringhatta and there was no such trouble. It was considered that the practice of leaving young bulls together would result in their picking up bad habits. This might be partly or largely responsible for this trouble. Proper methods of rearing were, therefore, to be tried and particular attention to be devoted to this aspect of the question.

The Chairman said that a comprehensive programme, taking into consideration climate, feeding etc., should be prepared. Dr. Panse, Statistical Adviser to the Council was also of the same view.

Dr. Bhattacharya pointed out that it would not be easy to study all these problems in one project. These problems would have to be studied one by one. A climatological laboratory had been set up at Izatnagar to study the climatic aspect.

The Animal Breeding Committee's recommendation was endorsed by the Advisory Board and the scheme recommended.

SUBJECT NO. M-13

CATTLE STERILITY—EXTENSION TO REMAINING VETERINARY COLLEGES, NEW SCHEME—CO-ORDINATED SCHEME, INDIAN COUNCIL OF AGRICULTURAL RESEARCH

At the Advisory Board. Dr. Bhattacharya said that the Regional Sterility Scheme was working at six regional stations with one coordinating station at the Indian Veterinary Research Institute. The six regional stations were located at the six veterinary colleges. It would be recalled that officers from different States were sent to Stockholm for training under Professor Lafgerloff. The present proposal was to send a further batch of 4/5 workers to Stockholm for training, and extend the regional sterility scheme to the remaining Veterinary colleges.

The Advisory Board endorsed the recommendation of the Animal Breeding Committee and recommended the scheme.

SUBJECT NO. M-14

ESTIMATION OF MILK SUCKLED BY CALVES IN UNWEANED HERDS, NEW SCHEME—INSTITUTE OF AGRICULTURE, ANAND

The Advisory Board recommended the scheme for sanction subject to the remarks of the Animal Breeding Committee.

SUBJECT NO. M-15

SUPPLY OF PROTECTIVE CLOTHING TO THE STAFF OF THE CENTRAL ARTIFICIAL INSEMINATION STATION, BANGALORE, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board endorsed the recommendations of the Animal Breeding Committee and recommended the proposal.

SUBJECT NO. M-16

STUDY OF THE EFFECT OF CASTRATION OF MALE BUFFALOES AND CATTLE AT DIFFERENT AGES ON THEIR UTILITY FOR DRAUGHT, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board agreed with the view of the Animal Breeding Committee that there was no yardstick for the measurement of the draught capacity of cattle and, therefore, recommended that the consideration of the scheme might be deferred until such time as the results under the other similar schemes in operation were available. The Board, however, recommended that the possibilities of conducting investigations under the Key Village schemes, on the lines proposed in this scheme, should be explored.

SUBJECT NO. M-17

PHYSIOLOGY OF THE HUMP, DEWLAP AND SHEATH, NEW SCHEME—WEST BENGAL

At the Advisory Board, Dr. Bhattacharya briefly explained the recommendations of the Eastern Regional Committee.

The Chairman remarked that this problem appeared to be of national importance and not only of local concern. It should, therefore, be financed 100% by the Council and schemes should be invited from other States also.

Dr. Datta (West Bengal) said that it was at the instance of the Indian Council of Agricultural Research that this idea originated. A circular was issued to all the States by the Indian Council of Agricultural Research asking for similar schemes. This scheme had come through the Agriculture Research Board of the State and had been approved by it.

The Advisory Board endorsed the recommendations of the Eastern Regional Committee and the Animal Breeding Committee, and recommended that the scheme should be financed cent per cent by the Indian Council of Agricultural Research.

SUBJECT NO. M-18

PROGENY TESTING OF MURRAH BULLS NEW SCHEME—AAREY (BOMBAY)

Dr. Bhattacharya explained the main features of the scheme and referred to the discussion in the Scientific Committees.

The Advisory Board endorsed the recommendation of the Animal Breeding Committee that the Scheme should be sanctioned.

SUBJECT NO. M-19

CROSS-BREEDING OF CATTLE IN HILLY AND HEAVY RAINFALL AREAS—WEST BENGAL—PROPOSAL FOR ADDITIONAL STOCKMEN, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Bhattacharya explained that this scheme from West Bengal was sanctioned on the lines of similar schemes from other States, but it was found that, owing to transport difficulties in the Darjeeling area, six Stockmen were not sufficient for the purpose. The proposal to give additional six stockmen only was recommended by the Animal Breeding Committee.

The Advisory Board endorsed the recommendation of the Animal Breeding Committee and recommended the proposal for sanction.

SUBJECT NO. M-20

EVOLVING SUITABLE DRAUGHT CAPACITY STANDARD FOR BULLOCKS, EXTENSION—INDIAN VETERINARY RESEARCH INSTITUTE

Dr. Bhattacharya explained that the extension proposal was placed before the Advisory Board last year and it was then decided by the Board that a Technical Committee should go to Izatnagar, make on-the-spot assessment of progress of work done under the scheme and also suggest whether extension should be given and what staff and other facilities would be necessary for the extension period. The Technical Committee visited Izatnagar on the 10th October, 1956 and recommended the extension for a period of three years. That Committee also suggested some expanded technical programme for which some more staff had been asked for. This was recommended by the Animal Breeding Committee.

The Advisory Board recommended the extension proposal for sanction.

SUBJECT NO. M-20 (A)

THE IDEAL ANIMAL TO BE AIMED AT BY THE BREEDER IN BREEDING FOR HIGH PRODUCTION—DEFINITION OF, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Bhattacharya said that a reference was made by the Chairman yesterday in his opening remarks about this scheme. The scheme was recommended by the Animal Breeding Committee but the financial aspect was not considered at that time. It had since been prepared by the Secretariat of Indian Council of Agricultural Research and the expenditure was only Rs. 20,303

In reply to the Chairman's query whether it would be possible for Shri Nanda to act as Chairman after retirement, Dr. Bhattacharya explained the position that Shri Nanda's name was suggested in his personal capacity since he had a wide experience and not because he was Animal Husbandry Commissioner.

The Advisory Board recommended the scheme for sanction.

(b) SHEEP AND WOOL

SUBJECT NOS. M-21 & M-24

21. WOOL ANALYSIS LABORATORY, EXTENSION—GAYA (BIHAR)

24. SHEEP AND WOOL IMPROVEMENT ON REGIONAL BASIS EXTENSION,—GAYA (BIHAR)

Dr. Bhattacharya said that as the above two items related to the same type of work they could be taken up together.

He explained that the Wool Committee had recommended the extension of the schemes on the basis of the proposals received for a period of one year, *i.e.*, from 1st April, 1957 to 31st March, 1958, and that the Animal Breeding Committee had endorsed this recommendation.

The Advisory Board recommended the extension of the schemes.

SUBJECT NO. M-22

SHEEP AND WOOL IMPROVEMENT ON REGIONAL BASIS. EXTENSION—UTTAR PRADESH

Dr. Bhattacharya said that this was a wool improvement scheme on regional basis and had been approved by the Animal Breeding Committee.

The Advisory Board recommended the extension of the scheme for a further period of 3 years.

SUBJECT NO. M-23

SHEEP AND WOOL IMPROVEMENT ON REGIONAL BASIS. EXTENSION—POONA (BOMBAY)

The Advisory Board recommended the extension for sanction.

SUBJECT NO. M-25

WOOL UTILISATION CENTRE, NEW SCHEME—MADRAS

Dr. Bhattacharya said that this scheme was recommended by the Wool Committee.

The Advisory Board endorsed the recommendation of the Wool Committee and recommended the scheme for sanction.

SUBJECT NO. M-26

SKIN STUDIES OF SHEEP, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Bhattacharya explained that this was a model scheme prepared by the Indian Council of Agricultural Research. The proposal was to take up work on studies of sheep skin in the Regional Sheep Breeding Stations in Rajasthan, Bombay and Uttar Pradesh States. The proposal had been recommended by the Wool Committee and also by the Animal Breeding Committee.

The Advisory Board endorsed the recommendation of the above two committees.

SUBJECT NO. M-27

DEVELOPING MUTTON BREEDS OF SHEEP, NEW SCHEME—CHINGLEPUT (MADRAS)

Dr. Bhattacharya explained that this was a research scheme for developing mutton breed of sheep at Sheep Breeding Research Station, Chingleput (Madras). The scheme was recommended by the Animal Breeding Committee but it had suggested that the technical programme of the scheme should be drawn up by a Sub-Committee.

The Advisory Board recommended the scheme for sanction subject to the condition proposed by the Animal Breeding Committee.

SUBJECT NO. M-28

RESEARCH UNITS FOR STUDY OF SHEEP PRODUCTION IN A MIXED FARMING ECONOMY, MODEL SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Bhattacharya explained that it was a co-ordinated scheme for the establishment of Research Units for study of Sheep production in a mixed farming economy. This study was considered to be very important. As the object of the scheme was very broad, a subcommittee had been appointed by the Animal Breeding Committee to examine it in all its aspects and to submit a revised scheme next year.

Dr. Chadha, Director of Veterinary Services, Bombay enquired whether such a work was being done elsewhere in the country or abroad.

Dr. Uppal informed him that it was being done in California when he visited that place last. Such a work was also going on in Australia.

The Advisory Board did not recommend the scheme in the present form, for sanction, but decided to await the revised scheme, as recommended by the Animal Breeding Committee.

(c) Goat

SUBJECT NO. M-29

EXPLORING THE POSSIBILITIES OF MOHAIR PRODUCTION, NEW SCHEME—ANDHRA

Dr. Bhattacharya explained that this scheme was on the lines of the Angora breeding scheme which had been worked out in Uttar Pradesh. This was recommended by the Animal Breeding Committee.

Shri Bhagwan Dass, Director of Animal Husbandry, Andhra Pradesh, said that it had been suggested that the Indian Council of Agricultural Research and the State should share both the expenditure as well as receipts on a 50 : 50 basis, but the peon had to be provided by the State.

Dr. Bhattacharya explained in reply that it was so because the policy of the Indian Council of Agricultural Research was that peon should not be provided by the Indian Council of Agricultural Research unless the nature of work justified the provision of peon.

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. M-30

INDIGENOUS GOAT BREEDING EXTENSION—HISSAR (PUNJAB)

Dr. Bhattacharya said that this was an extension proposal and the same *ad hoc* Committee which examined the other scheme at Hissar (*vide* subject No. M-11) also examined this scheme and its opinion was that like the other scheme, a stage had been reached when the work on this scheme could also be taken over by the Punjab Government. For the same reason for which the other scheme had been recommended for extension, *viz.*, administrative difficulties, the Animal Breeding Committee recommended extension for this scheme also for a period of 2 years on the same condition that the State Government should give an undertaking that on the expiry of this extension period, that Government would take upon itself the responsibility of running the scheme and would not discontinue the work after the extension period. The recommendation of the Animal Breeding Committee was endorsed by the Advisory Board.

(d) Poultry and Duck

SUBJECT NO. M-31

DEFERTILIZATION OF EGGS—FOLLOW-UP WORK, NEW SCHEME—INDIAN VETERINARY RESEARCH INSTITUTE

Dr. Bhattacharya said that this was a follow-up work. The scheme had been recommended by the Poultry Committee as well as the Animal Breeding Committee. The scheme was approved by the Advisory Board.

SUBJECT NO. M-32

STUDIES ON THE GROWTH RATE AND EGG PRODUCTION OF PURE-BRED VERSUS CROSS-BRED POULTRY WHEN FED ON TWO DIFFERENT DIETS, NEW SCHEME—WEST BENGAL

The scheme was recommended by the Advisory Board on the usual 50 : 50 basis.

SUBJECT NO. M-33

CORRELATION BETWEEN PHYSICAL BODY CHARACTERISTICS AND EGG PRODUCTION, NEW SCHEME—INDIAN VETERINARY RESEARCH INSTITUTE

The Advisory Board endorsed the recommendation of the Animal Breeding Committee and recommended the scheme for sanction subject to the modifications suggested by the Poultry Committee.

SUBJECT NO. M-34

ECONOMICS OF POULTRY KEEPING, NEW SCHEME—AGRICULTURAL INSTITUTE, KATPADI

The Advisory Board endorsed the recommendations of the poultry Committee and did not recommend the extension of the scheme.

SUBJECT NO. M-35

STUDYING THE INFLUENCE OF CLIMATE ON THE PERFORMANCE OF IMPROVED DESI FOWLS, EXTENSION—ORISSA

After considering the recommendations of the Poultry Committee and the Animal Breeding Committee, the Advisory Board did not recommend the extension of the scheme. The Advisory Board also recommended that the scheme sanctioned, but not yet started, should be held in abeyance.

SUBJECT NO. M-36

EGG LAYING TRIALS, EXTENSION—INDIAN VETERINARY RESEARCH INSTITUTE

The Advisory Board recommended the extension of the scheme.

SUBJECT NO. M-37

CHICK HATCHERY PROCESSING PLANT—ADDITIONAL FUNDS, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Vice President desired to know the production of chickens in some of the States. Some figures were given regarding Madras, Kerala, Andhra and Assam. The representatives of the State said that the following figures were only tentative:

Madras	10,000
Kerala	25,000
Andhra	20,000
Assam	3,000 to 4,000

The Advisory Board recommended that a sum of Rs. 21,000 should be provided to the institute as asked for.

(E) OTHER LIVESTOCK

SUBJECT NO. M-38

PRODUCTION OF STERILITY IN INDIAN MONKEYS BY DRUG THERAPY. NEW SCHEME—CENTRAL DRUG RESEARCH INSTITUTE

Dr. Bhattacharya explained the recommendations of the Animal Breeding Committee and added that the scheme had also a bearing on another scheme to find out as to how to induce sterility in cattle and that in view of the ban on cow-slaughter, the problem had become one of paramount importance. In reply to the Vice Chairman's query whether there was any preliminary information on the subject, Dr. Datta, Director of Veterinary Services and Animal Husbandry, West Bengal said that there were two drugs, one from America and one from India. There was a doctor working at it and the drug was prepared from a pea family plant by which it was possible to produce temporary sterility in human females and that work had to be extended here.

Thereupon, the Chairman said that details about the herbal agents to be used should also be given.

The Advisory Board endorsed the recommendations of the Animal Breeding Committee.

SUBJECT NO. M-39

ESTABLISHMENT OF A CAMEL FARM FOR THE BIKANERI BREED AND OPENING OF 10 KEY VILLAGE CENTRES FOR THE IMPROVEMENT OF CAMELS IN RAJASTHAN NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board endorsed the recommendations of the Animal Breeding Committee that the scheme should be financed both by the Indian Council of Agricultural Research and the Rajasthan State Government on the usual 50:50 basis. It was also agreed that a Class I Officer should be provided instead of a Class II Officer for the efficient execution of the work.

SUBJECT NO. M-40

DIPLOMA COURSE IN SWINE HUSBANDRY AND PORK PROCESSING, NEW SCHEME—UTTAR PRADESH

The Advisory Board endorsed the recommendations of the Animal Breeding Committee and approved the proposals.

SUBJECT NO. M-41

EVOLVING A NEW TYPE OF PIGS BY CROSS-BREEDING, NEW SCHEME—UTTAR PRADESH

Dr. Bhattacharya, while briefly explaining the recommendations of the Animal Breeding Committee, said that like the Camel scheme which had been discussed earlier, it was for the first time that a scheme on the development of pigs was being sanctioned.

The Advisory Board approved the scheme and recommended it for sanction.

N.—ANIMAL NUTRITION

SUBJECT NO. N-1

INVESTIGATING THE CAUSES OF DELAYED MATURITY OF CATTLE UNDER VILLAGE CONDITIONS AND ITS EFFECT ON REPRODUCTION, PREPARATION OF MODEL SCHEME,—ORISSA, PUNJAB, ANDHRA, PEPSU, MADRAS, TRAVANCORE-COCHIN, MYSORE, BHOPAL, KUTCH,, UTTAR PRADESH. BIHAR, HYDERABAD, AJMER AND MADHYA PRADESH

The Advisory Board decided that the approval of the scheme should await its finalization by the Sub-Committee proposed by the Animal Nutrition and Animal Breeding Committees.

SUBJECT NO. N-2

DETERMINATION OF ECONOMIC POULTRY RATIONS, NEW SCHEME—ANDHRA, MADRAS AND PUNJAB

The Advisory Board endorsed the recommendations of the Regional and Scientific Committees concerned and recommended the scheme for sanction for a period of three years in each state.

The Chairman suggested that the Indian Standards Institution should be approached for standardisation of the Poultry feeds. The Delhi Cloth Mills and other organisations were interested in such investigations, so that they might produce cheap poultry feeds on a commercial scale. He further suggested that meat from such useless animals as pariah dogs etc., might also be utilised for the production of poultry feed, as was being done in some other countries.

SUBJECT NO. N-3

INVESTIGATIONS OF THE TOXIC PLANTS AND HERBS LETHAL TO DOMESTIC ANIMALS, REVISED SCHEME—WEST BENGAL

Dr. Kehar said that actually the scheme was approved last year but its technical programme was submitted late. It was considered at the Animal Nutrition Committee and was recommended.

The Chairman pointed out that it had been reported that ponies on their way to Amarnath often died near Panchtarni. This might be due to their eating some of the poisonous plants which were found *en route*. He, therefore, suggested that such investigations should be carried out in areas where there was a high mortality among animals due to poisonous plants. Therefore, schemes should also be invited from those areas also. As a matter of fact, this should also be a regional scheme.

Dr. Datta endorsed the suggestions of the Chairman and said that the idea to make it a regional scheme was very good. Efforts should be made to correlate and co-ordinate in formation from the other States.

The Advisory Board endorsed the recommendations of the Animal Nutrition Committee and approved the revised scheme and also recommended that similar schemes should be invited from other States.

SUBJECT NO. N-4

INVESTIGATIONS ON THE NUTRITIONAL REQUIREMENTS OF GOATS IN ORISSA, NEW SCHEME—ORISSA

The Advisory Board recommended the scheme for sanction subject to the modifications suggested by the Animal Nutrition Committee.

SUBJECT NO. N-5

RESPONSE OF DIFFERENT BREEDS TO DIFFERENT LEVELS OF NUTRITION, NEW SCHEME—WEST BENGAL

The Advisory Board endorsed the recommendations of the Animal Nutrition Committee and recommended that the scheme should be revised in the light of the remarks made by that Committee, that the post of Jamadar should be deleted, and that expenses of the scheme should be shared on 50:50 basis as usual.

SUBJECT NO. N-6

EVALUATION OF VITAMIN ADEQUACY AND SPECIFIC METABOLIC FUNCTIONS IN LIVESTOCK, NEW SCHEME—WEST BENGAL

Dr. Kehar explained that this was a new scheme from West Bengal and was recommended by the Animal Nutrition Committee provided the scheme was revised by the State Government as suggested by that Committee and their concurrence to meet 50% share of expenditure was obtained before it was placed before the Advisory Board.

Dr. Sikka being the officer responsible for submitting this scheme, explained that it was sent in response to a definite recommendation from the Centre based on the recommendations made at the Food and Agricultural Organisation Conference held in Australia that work on certain items should be taken up. There was no intention, while submitting the scheme, that the other work which was in progress at Haringhata would be stopped. This was only a supplementary work.

The Chairman suggested that the Indian Veterinary Research Institute might take up this work even at Haringhata which was now a regional station. Dr. Kehar explained that this part of the programme which was envisaged in the scheme would be taken up at the Regional Stations after some time. They were working according to a set programme and during the first two or three years this part of the work could not be taken up by that regional station. In reply to a further query by the Chairman as to whether this work was not being done at the Central Station at the Indian Veterinary Research Institute, Dr. Kehar replied that it was being done but, as the nutrients or the vitamin contents of various feeds under different soils and climates differed from region to region, this information would naturally be useful if it was obtained before Regional Stations could devote their time to this work.

The Advisory Board recommended the scheme for sanction, subject to the modifications suggested by the Animal Nutrition Committee and the condition that the expenditure should be shared on a 50:50 basis.

SUBJECT NO. N-7

INVESTIGATION ON THE NUTRITIONAL REQUIREMENTS OF PIGS, NEW SCHEME—INDIAN VETERINARY RESEARCH INSTITUTE

Dr. Kehar explained that the objective of this scheme was to investigate the various types of food requirements of pigs. Such investigations were very much emphasised at the International Animal Husbandry Conference. No work of this type had yet been attempted in this country. It was recommended by the Animal Nutrition Committee that cheap feeding stuffs and other waste materials which would not compete with human food should be used.

While stressing the importance of the scheme, Dr. Kehar further said that actually in this country the fact had not been appreciated that the pig was one of the animals which could most quickly convert the feeds or the calories into human food and, if the animal protein per head was to be increased, this was one of the very important measures.

The Advisory Board recommended the scheme, subject to the modifications suggested by the Animal Nutrition Committee.

SUBJECT NO. N-8

EFFECT OF NUTRITION ON ANIMAL PRODUCTS IN COWS AND BUFFALOES, NEW SCHEME—INDIAN VETERINARY RESEARCH INSTITUTE

The Advisory Board accepted the recommendation of the Animal Nutrition Committee that this work should form a part of the normal activities of the Indian Veterinary Research Institute and the National Dairy Research Institute.

SUBJECT NO. N-9

INVESTIGATION ON THE QUALITY OF WOOL AND MEAT IN RELATION TO THE NUTRITION OF SHEEP, NEW SCHEME—B. R. COLLEGE, AGRA

Dr. Kehar explained the scheme and said that this was a new type of work based on the recommendation of the Animal Husbandry Conference held in Madrid. The Chairman asked whether the investigation would be of any economic importance. Dr. Kehar replied in the affirmative and added that only the weight of the animal was at present appreciated in India and not the quality of the animal breed and this concept would disappear in a few years' time. The nutritional study envisaged under the scheme would indicate as to what extent the meat and wool of sheep would be affected by keeping the animal at different places, by changing one nutrient for the other. The reason why the B. R. College would be suitable for this study was that they had a well qualified professor who could guide the research work and he was previously working at the Indian Veterinary Research Institute.

The Advisory Board accepted the recommendations of the Animal Nutrition Committee and recommended the scheme.

SUBJECT NO. N-10

INVESTIGATIONS ON THE CAUSES OF DEGENERATION OF CATTLE IN HUMID CLIMATE, EXTENSION—INDIAN VETERINARY RESEARCH INSTITUTE

The Advisory Board accepted the recommendations of the Animal Nutrition Committee and recommended the extension proposal for sanction.

SUBJECT NO. N-11

UTILISATION OF WASTE PRODUCTS AS CATTLE FEED, EXTENSION—ORISSA

The Advisory Board accepted the recommendations of the Animal Nutrition Committee and recommended the extension.

SUBJECT NO. N-12

INVESTIGATION OF PHYSIOLOGICAL NORMS OF INDIAN CATTLE WITH SPECIAL REFERENCE TO WEST BENGAL, EXTENSION—WEST BENGAL

The Advisory Board endorsed the recommendations of the Scientific Committee that the scheme should not be extended unless the reports on the working of the scheme were received and their value adjudged at the spring meeting of the committee.

SUBJECT NO. N-13

FURTHER WORK ON PADDY STRAW, EXTENSION, INDIAN VETERINARY RESEARCH INSTITUTE

In the course of the discussion on the subject it was pointed out that some of the results of research should be passed on to the farmers and extension workers. However, Dr. Kesar was hesitant to make any definite recommendation and said that he would like to wait for one more year. In this connection, Dr. Kehar informed the Advisory Board that, when he had been to a village some years ago, he happened to see the villagers soaking the paddy straw in the water. Due to the non-availability of water nearby they were using the same water for several washing and as drinking water for animals. He suggested, that if a little bit of lime was added to the water, it could be used for some more washings and for animals to drink.

The Chairman desired that ways and means should be found to use the straw treated in this manner and where paddy straw was not being properly utilised for feeding the animals, the possibilities of using it for rope making, mat weaving etc., should be explored.

The Advisory Board recommended that a note should be prepared on this problem by Dr. Kehar in collaboration with Dr. Patel.

The Advisory Board endorsed the recommendations of the Animal Nutrition Committee and recommended the extension proposal.

SUBJECT NO. N-14

STUDY OF THE VALUE OF UREA AS A PROTEIN SUBSTITUTE IN THE RATIONS OF COWS AND BUFFALOES FOR GROWTH AND MILK PRODUCTION, ADDITIONAL GRANT—INDIAN VETERINARY RESEARCH INSTITUTE

The Advisory Board recommended the additional grant asked for and suggested that the economics of the problems should also be studied.

SUBJECT NO. N-15

PROVISION OF ONE ASSISTANT RESEARCH OFFICER, ONE STATISTICAL ASSISTANT AND ONE STENOGRAPHER FOR THE CO-ORDINATING OFFICER (ANIMAL NUTRITION), NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The provision asked for was recommended by the Advisory Board for approval by the Governing Body.

SUBJECT NO. N-16

PROVISION OF JEEPS AND ADDITIONAL EQUIPMENT FOR EACH OF THE REGIONAL ANIMAL NUTRITION RESEARCH STATIONS, NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board recommended the proposal for allotment of necessary funds.

O.—DAIRY SCIENCE

SUBJECT NO. O-1

'LET DOWN' RESPONSE OF SOME BREEDS OF INDIAN COWS AND BUFFALOES AND THE SCOPE OF MILKING THEM MECHANICALLY, NEW SCHEME—ANDHRA

The Advisory Board did not recommend the scheme for sanction but agreed to the suggestion of the Dairy Science Committee that the scheme might be revised and re-submitted.

SUBJECT NOS. O-2 AND O-3

2. SURVEY OF BACTERIOLOGICAL QUALITY OF MILK SUPPLY IN ANDHRA, NEW SCHEME—ANDHRA

3. SURVEY OF BACTERIOLOGICAL QUALITY OF MILK SUPPLY IN ALLAHABAD, NEW SCHEME—ALLAHABAD AGRICULTURAL INSTITUTE

Dr. Sen explained that these two schemes were part of a co-ordinated scheme on research work on bacteriological quality of milk with special reference to the future programme of milk supply in big cities of India. Both these schemes had been agreed to by the Dairy Science Committee subject to certain modifications.

In reply to a query from a member whether only one scheme would not do, Dr. Sen explained that there were likely to be differences because of climatic conditions in different areas, the distance from where the milk was to be collected and so on; such investigations were necessary for large scale milk supply schemes in big towns. Therefore, the Dairy Science Committee thought that this work should be taken up at a few places. One Centre had already been sanctioned in Anand, another for Delhi and another for Haringhata. Unless more information was available the milk supply schemes would not be successful. Dr. Sen added that these were partly developmental schemes. The intention was to start in different places milk powder producing factories during the Second Five Year Plan not only in the case of milk powder but also creamery. These related to survey work.

The Director of Animal Husbandry, Andhra said that a provision of Rs. 15,000 was proposed by the State Government for the construction of a temporary building but the Dairy Science Committee had recommended that a permanent place should be provided by the State Government at their own cost. He requested for a grant for the purpose from the Council, particularly having regard to the fact that no building would be available in the area and Andhra Pradesh was a deficit state.

The Chairman replied that in accordance with the procedure laid down by the Council, the non-recurring expenditure should be borne by the State Government and no deviation from it could be made.

The recommendations of the Dairy Science Committee were endorsed by the Advisory Board.

SUBJECT NO. O-4 to O-7

4. ECONOMICS OF SPECIALISED DAIRY FARMING, NEW SCHEME—WEST BENGAL

5. ECONOMICS OF SPECIALISED DAIRY FARMING, NEW SCHEME—INSTITUTE OF AGRICULTURE, ANAND

6. ECONOMICS OF SPECIALIZED DAIRY FARMING, NEW SCHEME—NDIAN VETERINARY RESEARCH INSTITUTE

7. ECONOMICS OF SPECIALIZED DAIRY FARMING, NEW SCHEME—MADRAS

Dr. Sen said that these were specialised schemes and formed part of the co-ordinated research programmes. The object was to find out whether a specialised dairy would be a paying proposition. It had to be seen that by having a certain limited acreage under irrigated condition, it would be possible to grow fodder crops and get as much return, if not more, than from a cash crop. Unless this was aimed at, there was not much scope for large scale dairy units being established.

Study on the economics of specialised dairy farming was an important scheme sponsored by the West Bengal Government. The Dairy Science Committee approved the scheme in principle with a suggestion that an arable farming holding should be included as control for comparison. In view of certain lack of details, it was suggested that the procedure for working out the cost might be prepared in consultation with experts and then presented. Although the scheme had been accepted in principle, the whole matter would have to be gone into again. This would be the case with the other schemes at the Indian Veterinary Research Institute and Madras perhaps with the exception of the scheme at the Anand Institute, where also, this scheme would have to be reconsidered although accepted in principle. The reason why it was proposed to run it at the Indian Veterinary Research Institute was that it was designed to be studied at the different parts of the country.

The Chairman said that it would be better to draw up these schemes on a regional basis just as it was done in the case of other schemes dividing the country on a regionwise basis. There should be one special *ad hoc* Committee consisting of one representative each from the Dairy Science Committee, Animal Breeding Committee, Statistical Committee and the Agricultural Economics Committee. The scheme should be prepared by this Committee on a regional basis, according to the animal husbandry division. Thereafter, the schemes should be examined by the relevant Committees.

The Advisory Board approved the schemes in principle, and decided to await a revised co-ordinated scheme to be prepared by the *ad hoc* Committee.

P.—ANIMAL DISEASES

SUBJECT NO. P-1

DISEASE INVESTIGATION OFFICER'S SCHEME, EXTENSION—TRAVANCORE-COCHIN

The Advisory Board accepted the recommendations of the Animal Diseases and Pests Committee and recommended the extension proposal, subject to the conditions laid down by the Committee.

SUBJECT NO. P-2

HUMPSORE SCHEME, EXTENSION—ORISSA

The Advisory Board accepted the recommendations of the Parasitology Committee. which were endorsed by the Animal Disease and Pests Committee, and recommended the scheme for sanction.

SUBJECT NO. P-3

ASSISTANT DISEASE INVESTIGATION OFFICER (SHEEP AND GOATS), EXTENSION—UTTAR PRADESH

The Advisory Board recommended the extension of the scheme subject to the modifications suggested by the Animal Diseases and Pests Committee.

SUBJECT NO. P-4

MASS INVESTIGATION OF VILLAGE POULTRY AGAINST RANIKHET DISEASE, EXTENSION—BOMBAY

The Advisory Board was informed that this scheme was sanctioned previously on the definite understanding that the work would not be continued beyond the period asked for. Now the State Government had come for an extension for four years.

The Advisory Board in agreement with the Animal Diseases and Pests Committee, did not recommend the extension of the scheme and suggested that this work, which was actually in the nature of development work should be done by the State Government as its own.

SUBJECT NO. P-5

BOVINE CONTAGIOUS PLEURO-PNEUMONIA, EXTENSION-ASSAM

The Advisory Board accepted the recommendations of the *ad hoc* Committee which had been appointed for examining the working of this scheme on the speed and laying down the future programme of work.

SUBJECT NO. P-6

BIONOMICAL STUDIES OF COMMON FLUKES, NEW SCHEME —WEST BENGAL

This scheme was examined by the Eastern Regional Committee, which had suggested that it should be revised so as to confine the work to worms common in West Bengal as work on most of the parasites had already been undertaken at the Indian Veterinary Research Institute and elsewhere. The revised scheme was approved by the Parasitology and Animal Diseases and Pests Committees subject to certain modifications.

The Advisory Board accepted the recommendations of the Scientific Committees and recommended the revised scheme

SUBJECT NO. P-7

STUDIES ON MYCOTIC DISEASES, NEW SCHEME—WEST BENGAL

The Eastern Regional Committee considered this scheme in great details and made certain remarks. The scheme was also thoroughly scrutinised by the Animal Diseases and Pests Committee, which had also made certain recommendations.

Dr. Vasudeva wanted to know at what place the specimens would be identified. He pointed out that the School of Tropical Medicine had been making some mess in this work. Dr. Vasudeva desired that a Mycologist should be associated with the work.

Dr. Dutta from West Bengal appreciated the idea that a Mycologist should also be associated with the work. He also pleaded that 100% of the cost should be met by the Indian Council of Agricultural Research due to the nature of the work and as this was the first work which the West Bengal Government was going to launch.

The Advisory Board accepted the recommendations of the Animal Diseases and Pests Committee and recommended the inclusion of a mycologist in Class II grade in the staff and the provision of 100% expenditure by the Indian Council of Agricultural Research.

SUBJECT NO. P-8

STUDIES IN ANIMAL FILARIDS AND FILARIASIS, NEW SCHEME—BIHAR

Shri L. Sahai, while explaining the recommendations of the Eastern Regional Committee and the Animal Diseases and Pests Committee, said that the work should be carried out on the life-histories of only *Setaria cervi* and *Parafilaria bovicola.* This scheme was not received in time for consideration by the Parasitology Committee. The Animal Diseases and Pests Committee, which considered this scheme, recommended it for a period of three years subject to other cuts.

The Advisory Board endorsed recommendations of the Animal Diseases and Pests Committee and recommended the scheme for sanction.

SUBJECT NO. P-9

INVESTIGATION OF BRUCELLOSIS, NEW SCHEME—BIHAR

The Advisory Board recommended the scheme for sanction subject to the remarks of the Animal Diseases and Pests Committee.

SUBJECT NO. P-10

CONTROL OF HAEMMORHAGIC SEPTICAMEIA, BLACK QUARTER AND ANTHRAX IN ENDEMIC AREA, NEW SCHEME—MADRAS

Shri Sahai said that this scheme, like the Ranikhet disease scheme, envisaged mass vaccination and mass eradication of the diseases. This work was of a purely developmental nature and therefore, the Scientific Committees did not recommend the scheme.

The Advisory Board endorsed the recommendations of the Animal Diseases and Pests Committee and did not recommend the scheme.

SUBJECT NO. P-11

STUDY OF RICKETTSIAL INFECTIONS IN DOMESTICATED ANIMALS, NEW SCHEME—MADRAS

Shri Sahai said that there was no evidence at the present moment that rickettsial infections in domesticated animals were very common and, as material was not likely to be available in sufficient quantity for investigation of the problem, the Animal Diseases and Pests Committee did not recommend the scheme.

The Advisory Board endorsed the recommendations of the Animal Diseases and Pests Committee and did not recommend the scheme.

SUBJECT NO. P-12

APPOINTMENT OF ASSISTANT RESEARCH OFFICER (ASCARIASIS), NEW SCHEME—ANDHRA

The Advisory Board endorsed the recommendations of the Parasitology Committee and the Animal Diseases and Pests Committee and recommended the scheme for sanction subject to the remarks made by these Committees.

SUBJECT NO. P-13

INVESTIGATIONS INTO THE POSSIBILITIES OF LARGE SCALE MANUFACTURE OF HAEMMORHAGIC SEPTICAEMIA ADJUVANT VACCINE, NEW SCHEME—INDIAN VETERINARY RESEARCH INSTITUTE

The Advisory Board endorsed the recommendations of the Regional Committees and the Animal Diseases and Pests Committee and recommended the scheme for sanction.

SUBJECT NO. P-14

KEEPING QUALITY OF VETERINARY BIOLOGICAL PRODUCTS, NEW SCHEME—INDIAN VETERINARY RESEARCH INSTITUTE

The Advisory Board endorsed the recommendations of the Regional Committees and the Animal Diseases and Pests Committee and recommended the scheme for sanction, subject to the cuts suggested by the Animal Diseases and Pests Committee.

SUBJECT NO. P-15

EXPERIMENTAL STUDY OF BOVINE ANAESTHESIA, NEW SCHEME—ORISSA

Shri Sahai said that the object of the scheme was to find out suitable anaesthetics for bovines. The State Director of Veterinary Services was very much interested in bovine surgery and he wanted to carry out the studies as he considered that the results would be of great use.

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. P-16

INVESTIGATIONS ON THE USE OF STABILIZERS IN RINDERPEST AND RANIKHET DISEASE VACCINES, NEW SCHEME—UTTAR PRADESH

The Advisory Board endorsed the recommendations of the Animal Diseases and Pests Committee, subject to the modifications suggested by that Committee, and recommended the scheme for sanction, as the knowledge of the stabilizers to be used in Rinderpest and Ranikhet disease vaccines was not available in any other country.

Q.—HIDES AND SKINS

SUBJECT NO. Q-1

RESEARCH ON THE MANUFACTURE OF "FAT-LIQUORS" FROM INDIGENOUS RAW MATERIALS FOR LEATHER PRODUCTION FROM INDIAN HIDES AND SKINS, EXTENSION—CENTRAL LEATHER RESEARCH INSTITUTE

The Advisory Board endorsed the recommendations of the Hides and Skins Committee and recommended the extension proposal.

SUBJECT NO. Q-2

RESEARCH ON THE MANUFACTURE OF CHROME RETAN LEATHER FROM COW HIDES FOR MILITARY PURPOSES, EXTENSION—CENTRAL LEATHER RESEARCH INSTITUTE

The Advisory Board endorsed the recommendations of the Hides and Skins Committee and recommended the extension proposal.

SUBJECT NO. Q-3

RESEARCH ON THE MANUFACTURE OF LEATHER BOARDS FROM LEATHER SHAVINGS WHICH ARE WASTE PRODUCTS OF TANNERIES, EXTENSION—CENTRAL LEATHER RESEARCH INSTITUTE

The Advisory Board endorsed the recommendations of the Hides and Skins Committee and recommended the extension proposal.

SUBJECT NO. Q-4

IMPROVEMENT OF QUALITY OF SHOE UPPER AND INDUSTRIAL LEATHER MANUFACTURED BY MINERAL TANNING, EXTENSION—CENTRAL LEATHER RESEARCH INSTITUTE

The Advisory Board endorsed the recommendations of the Hides and Skins Committee and recommended the extension proposal.

R.—NIL

S.—FISHERIES

SUBJECT NO. S-1

SCHEME FOR THE STUDY OF MICROBIAL FLORA ASSOCIATED WITH FRESH WATER FISH IN WEST BENGAL AS WELL AS WITH THE ESTUARINE AND DEEP SEA FISH FROM THE BAY OF BENGAL, NEW SCHEME—WEST BENGAL

The Fisheries Development Adviser said that this scheme was a very useful one.

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. S-2

INVESTIGATION ON PROCESSING INEDIBLE AND UNPOPULAR FISH CAUGHT IN WEST BENGAL, EXTENSION—WEST BENGAL

The Fisheries Development Adviser said that this scheme was a very useful one and should, therefore, be sanctioned.

Shri Bhagwan Dass, Director of Animal Husbandry, Andhra Pradesh pointed out that there was a practical way of processing inedible and unpopular fishes. These could be cut in pieces, then mixed up with jaggery and dried up in the hot sun. With the result that there would be no foul smell left. He added that this practice was followed by Villages and he could not say whether this was technically sound.

The Chairman said that this might be brought to the notice of the Fisheries people.

The Advisory Board recommended the extension of the scheme for sanction.

T.—APICULTURE

SUBJECT NO. T-1

ESTABLISHMENT OF BEE-KEEPING RESEARCH CENTRE FOR NORTHERN REGION, NEW SCHEME—HIMACHAL PRADESH

At the Advisory Board Dr. Narayanan said that the scheme was very important from the point of view of the progress and development of bee-keeping research in India. Efforts were made to persuade Himachal Pradesh Government to share the scheme on a 50:50 basis. Despite various reminders to the State Government on this issue, no reply had been received at the time when this scheme was considered by the Apiculture Committee. It was understood that the State Government had since sent detailed proposals and had agreed to share 50% of the cost of the scheme. He, therefore, suggested that this scheme might again be examined at the next Apiculture Committee meeting.

The Advisory Board did not recommend the sanction of the scheme at 100%, but agreed that fresh proposals might be examined at the next Apiculture Committee meeting.

SUBJECT NO. T-2

IMPROVING HONEY YIELD OF BEE-HIVES NEW SCHEME—ANDHRA

Dr. Narayanan explained that according to the policy of the Indian Council of Agricultural Research, they were to run two stations, one in South India at Coimbatore and another in Punjab. With the coming of a new State, Andhra had got certain areas particularly adapted for bee-keeping. A small scheme had been put forward by that State but most of the items in the scheme were found to be of a developmental nature.

Sardar Lal Singh said that wherever he had gone throughout India, he had not found a single place where bee-keeping had been a success. Only a short time back, he want to Solan where a bee station was being maintained. The honey obtained there was so insignificant that it did not meet even 10% of the cost of maintenance. He thought that this so-called research on bee-keeping had been going on for the last 20 years without giving the Indian Council of Agricultural Research the slightest results. He felt that the Council should consider whether it would not be proper to have only two, or three stations in some suitable places in India which might be run on commercial lines.

The Chairman agreed that what Sardar Lal Singh had said was partly right, but asked the views of the Director of Agriculture, Kashmir.

Shri Dutt, Director of Agriculture, Kashmir said that so far as the yield was concerned, unless wild flora was available it would not be possible to increase any yield per hive. In Kashmir, there was one major flora that grew wild in the sub-mountainous tracts of the valley, it was in the flowering stage in the months of October and November, but great difficulty was experienced in feeding the bees in the months of July and August and a part of September. In so far as spring was concerned, bees in Kashmir had to depend only on fruit plants. In some Western countries of temperate region, the bees mainly depended on the clover. But in temperate region in India clover was a problem. Sufficient land with irrigation facilities could not be spread for cultivation of clover. He thought that out of all temperate territory, it would be worthwhile to develop one good station in Kashmir and find out the secondary purpose of some agricultural crops like clover. He added that he tried to cultivate wild flower on the Shankeracharya hill and he did succeed a lot. It was a bushy plant and once it grew it got on for years together, of course subject to protection from grazing.

Sardar Lal Singh said that he had got some practical experience of bee-keeping. His own view-point was that perhaps it was the Italian bees which were found to be the best. The other kinds of bees were able to collect more honey but they were more ferocious. The main difficulty was in this country that experiments had been carried out with Indian bees only which had been for generations past recognised as the poorest gatherers and most indifferent sort of bees. Sardar Lal Singh felt that that might be due partly to flora, but the main difficulty was about the kind of bees because in America three to four hundred pounds of honey could be got per hive while here more than four to five pounds could not be had. This was an important subjects which was being encouraged in all countries, but there was no use going on the beaten track of research. The best way would be to select two or three places in India which were considered to be most suitable localities, one might be in Kashmir, where somebody might not be a research man but who should have practical experience of bee-keeping, should be put in charge of the station. Italian bees should be introduced here in which case better results might be achieved. Sardar Lal Singh added that he was certain that it was not the lack of flora which was responsible for not giving good results.

He further suggested that one or two gentlemen who knew something about the subject might be asked to put up a scheme which should be definitely of a developmental nature and which should be designed to find out whether apiculture was at all a paying proposition in India.

It was further pointed out that one of the activities of the Khadi and Village Industries Board was to encourage bee-keeping and the Board was paying attention to the development aspect of bee-keeping all over India. If some reference were made to that Board, some result might be obtained.

Dr. Narayanan said that the Khadi and Village Industries Board was going to establish two or three stations. A decision had been taken by the Indian Standards Institution to stadardise the bee-hives that were suitable for India. The second aspect was research aspect. One was the question of importation of Italian bees. As far back as 1943 this question was very carefully considered and it was unanimously decided that it would be suicidal to import Italian bees for the simple reason that it was susceptible to diseases. As regards the reason why Indian bees were not able to give more honey, the simple reason was that for the last so many years the breeding aspect had never been taken into consideration at all. In the case of bees, the whole of the research in Europe as well as in America centred round two main problems, *i.e.*, one of breeding pedigreed bees and the other how to find out methods of eliminating disease.

Sardar Lal Singh said that he was of the firm view that if the Italian bees were able to resist the disease in America there was no reason why India would not be able to control it here. He said that it was not a good reason, because Italian bees were susceptible to certain disease, they should not be imported.

The Chairman said that so far as this scheme was concerned there was no harm if the research was extended to the Italian bees also, but it should not be a developmental work. The Khadi and Village Industries Board had got lot of funds for the development work. There should be some liaison between that Board and the Council which might be by way of inviting some representative of that Board to this Advisory Board Shri Kalapuram might be invited to the Advisory Board meeting.

The Advisory Board recommended that the State Government should revise the scheme so as to provide for research and not development, and that the revised scheme should be examined at the next meeting of the Apiculture Committee.

SUBJECT NO. T-3

CYTOGENETICAL AND HISTOCHEMICAL STUDIES ON THE MALE AND FEMALE GERM CELLS OF THE HONEY BEE. NEW SCHEME—PUNJAB UNIVERSITY

The Advisory Board accepted the recommendations of the Agriculture Committee.

U.—EDUCATION & TRAINING

SUBJECT NO. U-1

INDIAN COUNCIL OF AGRICULTURAL EDUCATION, EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Advisory Board recommended the scheme for approval by the Governing Body.

V.—NIL

W.—AGRICULTURAL ECONOMICS

SUBJECT NO. W-1

STUDY OF MECHANISED FARMING, NEW SCHEME—BANARAS HINDU UNIVERSITY

The Advisory Board enodresd the recommendations of the Agricultural Economics Committee and recommended the scheme for approval by the Governing Body.

SUBJECT NO. W-2

STUDY OF ADVANTAGES AND ECONOMICS OF MECHANISED FARMING, NEW SCHEME—MADRAS

The Advisory Board endorsed the recommendations of the Agricultural Economics Committee that, if a revised scheme were put up by the Government of Madras on the lines of the Banaras Hindu University scheme, confining its scope to collection of data pertaining to mechanised farming, the scheme would be considered.

SUBJECT NO. W-3

COLLECTION OF DATA IN RESPECT OF PRODUCTION, CONSUMPTION, SURPLUS AND SURVEY OF ECONOMICS OF MILK IN THE TWIN CITIES OF HYDERABAD AND SECUNDERABAD, NEW SCHEME—INDIAN INSTITUTE OF ECONOMICS, HYDERABAD

The Advisory Board did not recommend the scheme.

SUBJECT NO. W-4

INVESTIGATION TO ASCERTAIN THE USE AND WASTAGE OF MAN AND CATTLE POWER IN THE PRODUCTION OF PRINCIPAL CROP AND THE COST OF PRODUCTION OF SUCH CROPS, NEW SCHEME—WEST BENGAL

The Advisory Board was of the opinion that no fruitful result would come out of the scheme. The scheme was not recommended.

SUBJECT NO. W-5

STUDIES IN THE COST OF RECLAMATION OF KALLAR (ALKALI) LANDS UNDER CANAL-CUM-TUBE-WELL IRRIGATION, NEW SCHEME—KHALSA COLLEGE, AMRITSAR

Dr. Uppal informed the members that Dr. Daji, Assistant Agricultural Commissioner went to Amritsar and a revised scheme was prepared by him.

The Advisory Board recommended the revised scheme.

SUBJECT NO. W-6

SURVEY OF FARM AND NON-FARM EMPLOYMENT IN SOUTH ARCOT DISTRICT, NEW SCHEME—ANNAMALAI UNIVERSITY

After considering the scheme in detail, the Advisory Board found that the scheme was only of a pilot nature and a sum of Rs. 5.000 was to be spent.

The scheme was recommended to the Governing Body for approval.

SUBJECT NO. W-7

ENQUIRY INTO FACTORS INFLUENCING CROPPING PATTERNS ON INDIVIDUAL FARMS, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board accepted the recommendation of the Agricultural Economics Committee that a lump-sum provision of Rs. 50,000 should be made for the scheme. It, however, laid the condition that the scheme, should be examined by the Agricultural Economics Committee at its spring meeting.

SUBJECT NO. W-8

STUDY ON ADOPTION OF IMPROVED PRACTICES OF DIFFERENT TYPES OF FARMS, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board agreed with the recommendations of the Agricultural Economics Committee on the note on this subject.

SUBJECT NO. W-9

SURVEY AND STUDY OF THE AGRICULTURAL CONDITIONS, PROBLEMS, AND PRACTICES, OF UTTAR PRADESH, NEW SCHEME—UTTAR PRADESH

The Advisory Board felt that the work envisaged in the scheme was normally the work of the State and hence did not recommend the scheme.

X.—STATISTICS

SUBJECT NO. X-1

EVOLVING OF A SUITABLE TECHNIQUE FOR ASCERTAINING COST OF MILK PRODUCTION (SECOND FIVE YEAR PLAN), NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Panse, Statistical Adviser to the Council said that the scheme was the outcome of a proposal initiated by the Dairy Science Committee for finding out the cost of production of milk in different regions of the country. It had been prepared on the basis of the information obtained in the survey in Delhi State and approved by the Scientific Committees. The scheme formed part of the Second Five Year Plan. In reply to the question raised by the Chairman regarding the economic importance of the scheme, Dr. Panse said that reliable information on exploitation of an important commodity like milk was of fundamental value to any project concerning the setting up of milk production units on a large scale. The first survey was made in Delhi and it was proposed to take up the work in Madras, extending it later to the eastern part of the country. Thus, the scheme will be worked on a regional basis.

Sardar Lal Singh said that he felt that it should be borne in mind as to what advantage of practical value the country was going to have out of the results that would accrue out of this enquiry. He desired to know what use would be made of the results of this enquiry *i.e.*, whether a villager would be given higher price for his milk; whether this would induce him to increase the milk output and whether it would, in any way, improve dairy management or the system and pattern of distribution of milk. He personally felt that most of these enquiries had produced only paper reports and had not proceeded beyond that and desired that each and every research scheme in future should be so designed as to give some immediate results which could be put into practice.

Dr. Panse replied that the scheme would throw light on the various questions raised by Sardar Lal Singh. It was the Dairy Science Committee that wanted information on this topic and that was how the scheme was formulated. It had been discussed by the Dairy Science Committee and the planning Commission and they had agreed that the scheme was of essential importance designed to produce results of practical value.

Dr. Ghatge, Agricultural Marketing Adviser to the Government of India said that it should not be forgotten that economics is also a science and the technique of arriving at representative and reliable results in respect of cost of production of any commodity was going to be of fundamental importance to the planning of any project. Such schemes of technique should very much be encouraged so that standard methods for such economic surveys could be evolved.

In reply to the query of the chairman whetner the survey would help in fixing the price of milk, Dr. Panse said that he thought so. By determining the physical components of the cost of production it would be possible to calculate the price per seer of milk at any time by collecting information on prevailing prices and wages. The Chairman said that it would also help in the setting up of large-scale production of milk centres.

The scheme was recommended by the Advisory Board.

SUBJECT NO. X-2

STUDY OF BREEDS, MILK YIELD AND FEEDING AND MANAGING PRACTICES OF BOVINES (SECOND FIVE YEAR PLAN), EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Panse said that this scheme also formed part of the Second Five Year Plan and it was intended to obtain information on milk production, breeds, and animal husbandry practices in different animal husbandry regions. This was also on a regional basis. The information to be collected is basic for formulating development programme and further research in the field of animal husbandry. The first survey covered Punjab and PEPSU region and was in progress at present, and it was proposed to be extended to the eastern region.

The Advisory Board recommended the scheme.

SUBJECT NO. X-3

FURTHER INVESTIGATIONS ON THE TECHNIQUE OF SAMPLING OF FLEECES FOR ASSESSING WOOL QUALITY, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Panse said that this scheme was very important inasmuch as it would enable the sheep breeder to sample the fleece for determining the quality of wool produced on the sheep. The breeder was really in need of a simple technique for this purpose. Earlier this scheme had been run by the Indian Council of Agricultural Research on one breed in co-operation with Poona Sheep Breeding Station and it was now necessary that this should be extended to a larger number of representative breeds in the country. The part dealing with sampling of commercial wool was going to be studied in co-operation with the Agricultural Marketing Adviser.

The Scheme was recommended by the Advisory Board.

SUBJECT NO. X-4

PILOT INVESTIGATION FOR STUDY OF CULTIVATION PRACTICES AND YIELDS OF PEPPER IN MADRAS AND TRAVANCORE-COCHIN, EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Dr. Panse explained that as a result of this scheme it would be known for the first time what was the actual area under pepper in this country, what were the yields and what were the cultivation practices followed in this crop. It was hoped that after this pilot project was over, the States concerned would take up the work.

The scheme was recommended by the Advisory Board.

Y.—PUBLICATIONS & PUBLICITY

SUBJECT NO. Y-1

PREPARATION OF MONOGRAPH ON ALGAE, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Chairman said that this was a very useful work which the Indian Council of Agricultural Research had initiated. He hoped that this would be useful not only to research institutions and colleges, but also, to ordinary science colleges. Twenty eight volumes were to be prepared at a total cost of Rs. 3,02,000. These volumes would be written by eminent scientists in the country.

The scheme was recommended by the Advisory Board for the approval of the Governing Body.

SUBJECT NO. Y-2

PREPARATION OF MONOGRAPHS ON FUNGI, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Chairman said that this was a scheme for the publication of an up-to-date record of the research work done in India on the subject. The number of books would be 30 and would be written under the guidance of Dr. Vasudeva, Head of the Division of Mycology, Indian Agricultural Research Institute.

The Advisory Board recommended the scheme for approval by the Governing Body.

SUBJECT NO. Y-3

PREPARATION OF MONOGRAPH ON AGRICULTURAL METEOROLOGY, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Chairman said that it was keenly felt that there was no suitable book on agricultural meteorology which could be used by research workers. The scheme had, therefore, been initiated and Dr. L. A. Ramdass had been entrusted with the work.

The scheme was recommended by the Advisory Board for approval by the Governing Body.

SUBJECT NO. Y-4

REPRINTING OF THE HANDBOOK "STATISTICAL METHODS FOR AGRICULTURAL WORKERS" NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board recommended the printing of 2,500 copies of the Handbook entitled "Statistical methods for agricultural workers".

SUBJECT NO. Y-5

TRANSLATION INTO SPANISH OF THE BOOK "STATISTICAL METHODS FOR AGRICULTURAL WORKERS" by V. G. PANSE AND P. V. SUKHATME, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. Y-6

SUPPLY OF AGRICULTURAL INFORMATION LITERATURE TO THE NATIONAL EXTENSION SERVICE BLOCKS, EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Chairman informed the Advisory Board that the popular publications of the Indian Council of Agricultural Research would be supplied to the Village Level Workers, Block Development Officers and other project Officers to keep them fully posted with the latest developments in the field of Agriculture and Animal Husbandry and that arrangements had been made for translating these materials which were produced in English into various regional languages. Thus, the Village Level Workers and others who did not know much of English would be enabled to read this literature in their own languages. The languages were: Hindi, Tamil Marathi, Telugu, Bengali and Punjabi and it was hoped to extend the scheme after some time to cover other languages.

The Advisory Board recommended the scheme.

SUBJECT NO. Y-7

PRINTING OF THE HINDI JOURNAL "KHETI" EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board recommended the extension of the scheme.

SUBJECT NO. Y-8

BRINGING OUT OF INDIAN COUNCIL OF AGRICULTURAL RESEARCH PUBLICATIONS IN REGIONAL LANGUAGES, EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Chairman had already informed the Advisory Board of the arrangements made by the Council for bringing out the Indian Council of Agricultural Research publications in regional languages.

The Advisory Board recommended the extension of the scheme.

SUBJECT NO. Y-9

PUBLICATION OF A QUARTERLY POPULAR JOURNAL "INDIAN HORTICULTURE", NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Chairman heartily congratulated Mr. Kamath the Editor of the Journal for the great interest taken by him in this work and remarked that the publication was quite comparable to any other journal published anywhere else.

The Advisory Board recommended the scheme for sanction by the Governing Body.

SUBJECT NO. Y-10

PREPARATION OF SUMMARIES IN ENGLISH AND HINDI OF THE CIRCULAR LETTERS FOR THE USE OF COMMUNITY PROJECTS AND NATIONAL EXTENSION SERVICE BLOCKS—ADDITIONAL STAFF UNDER THE EDITOR'S SCHEME, NEW SCHEME —INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. Y-11

PUBLICATION OF A MONOGRAPH ON RICE NEW SCHEME— INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board recommended the sanction of Rs. 20,000 for the publication of the monograph.

SUBJECT NO. Y-12

PUBLICATION OF A QUARTERLY JOURNAL ON AGRICULTURAL EDUCATION, NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. Y-13

FREE SUPPLY OF INDIAN COUNCIL OF AGRICULTURAL RESEARCH PUBLICATIONS TO THE VARIOUS AGRICULTURAL AND VETERINARY COLLEGES IN INDIA, NEW SCHEME— INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. Y-14

PRINTING OF THE MONOGRAPH ON "POULTRY", NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. Y-15

PRINTING OF THE MONOGRAPH ON "MANGO", NEW SCHEME—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Chairman paid a tribute to Shri Prem Nath, Editor (Books) for having done hard work on the book and remarked that the publication will be the finest of its kind.

The Advisory Board recommended the scheme for sanction.

SUBJECT NO. Y-16

CHANGE IN THE LAY-OUT AND PRESENTATION OF MATERIAL IN THE "RICE NEWS TELLER" AND FIXATION OF ITS PRICE, ADDITIONAL GRANT—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The chairman complimented Shri Prem Nath Editor (Books) for having improved the publication very considerably.

The Advisory Board endorsed the recommendations of the Publication Committee and approved of the additional grant.

SUBJECT NO. Y-17

PUBLICATION OF CROP CALENDARS, CROP DIARIES AND CHARTS OF PLANT DISEASES, EXTENSION—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Advisory Board approved the extension proposals.

The Chairman invited suggestions on the animal husbandry series of monographs; Dr. Sahai suggested that there should be series of publication on nutrition and also on the diseases of animals. This should be divided into suitable parts and work entrusted to the specialists at the Indian Veterinary Research Institute. Regarding the existing publications on animal breeding, these would be examined by Dr. Bhattacharya

The Chairman thanked Dr. Uppal for the interest, he took in scrutinising the schemes placed before the Board so that only those schemes which were likely to yield some useful results were accepted. He also thanked the Chairman of the various Committees and representatives of the Central Commodity Committees for their contribution to the deliberations of the Board.

The Chairman remarked that it was for the first time in the history of the Council that the Advisory Board functioned as a true co-ordinating body for agricultural research inclusive of the work done under the aegis of the Central Commodity Committees. He expressed the hope that the Secretaries of these Committees would bring new ideas with them and make more useful contribution to the deliberations of the Board when they came to attend its meeting next time. The Chairman appreciated the interest taken by the Secretary, Additional Secretary and Shri P. L. Malhotra, Under Secretary in matters connected with the meeting of the Board and the hard work put in by the members of the staff.

The meeting of the Advisory Board then terminated with a vote of thanks to the Chair.

APPENDIX I

Address by Dr. M. S. Randhawa, D.Sc., I.C.S., F.N.I., Vice President. Indian Council of Agricultural Research, New Delhi, delivered on the 22nd November, 1956 at the 27th Meeting of the Advisory Board of the indian Council of Agricultural Research

Gentlemen,

I have great pleasure in welcoming you to the 27th meeting of the Advisory Board of the Indian Council of Agricultural Research. A number of significant changes in our organisation have taken place since our last meeting. Co-ordination between the commodity committees and the I.C.A.R. has been stressed for long. This has now been achieved by the enlarged Board of Research and Extension which apart from containing the specialists of the I.C.A.R. has also as members the Directors of Central Research Institutes, the Directors of Commodity Research Institutes as well as the Secretaries of the Commodity Committees. The utility of this Board on the extension side would also be greatly increased when the representatives of the Ministry of the Community Development are also included. The newly constituted Board has already made a list of results of research schemes which have been completed and which can be passed on to extension workers for general adoption. It has also indicated the items on which work may be intensified and has further indicated the problems on which research schemes should be initiated. It has further recommended that the results of research schemes of the Centre as well as of the States should be classified under two categories, *viz* (i) those which can be passed on to research workers and agricultural extension workers and (ii) which can be passed on to Village Level Workers and farmers.

Gap Between Research and Extension

The gap between research and extension is pointedly indicated by a number of facts. Though it has been known since 1945 that paddy straw washed with water and reinforced with lime becomes a palatable and nutritious food for cattle, no effort has been made to disseminate this finding in practice. Breeding of wheat which is resistant to all the three rusts is one of the major achievements of the I.A.R.I. If the hill areas are saturated with rust resistant wheat, the incidence of rust or wheat in the plains would decrease which will result in a very large increase in the production of wheat. Similarly. saturation of other areas with high incidence of rust with rust resistant wheat seed would also be of great value. It is unfortunate that no steps have been taken by the States to multiply rust resistant wheat seed according to their requirements. The facts which I have mentioned are only illustrative. There are a number of findings of research workers which are of practical value and which have not reached the farmers on a sufficiently large scale. If we apply the findings of our research schemes on a large scale there will be a sizeable increase in food production. This indicates the need of closer liaison between Research and Extension organisations.

Liaison Between Research and Extension

It is very necessary that a close liaison is built up with the staff of the N.E.S. from Development Commissioners down to the Village Level Workers on one side and the research staff of the I.C.A.R., the States as well as of the Commodity Committees. It was with this object that the Development Commissioners of some States have been requested to attend the meetings of the Commodity Committees such as the Indian Central Jute/Coconut and Lac Cess Committees. It has further been recommended by the Board that the results of research work on agriculture as well as on animal husbandry, whether done under the I.C A.R., or the Commodity Committees, should be compiled subject-wise, crop-wise and State-wise and published in the form of booklets and widely circulated among the extension staff as well as agricultural colleges and agricultural staff of the States.

Regional Research Stations.

Another field in which co-ordination between the I.C.A.R. and the Commodity Committees is necessary is that of research. I am glad that a scheme for regional research stations and sub-stations on cotton, millets and oilseeds has been drawn. These are rotation crops and as such an arrangement of this nature is possible. This will not only enable us to tackle agricultural problems relating to those commodities on a regional basis but at the same time will ensure efficiency and economy in expenditure. Moreover, research on cross-commodity problems would also be carried out on a rational basis. These regional stations would also provide coverage for fundamental research applicable to wide range of agro-climatic conditions.

Research Workers and Farmers.

It is unfortunate that some of our research workers still live in ivory towers. It is very necessary that the research workers should no longer remain isolated from farmers. In China, I am told, the research worker occasionally spends a part of his time in the villages and stays with the farmers so that he can have a better appreciation of the field problems. His whole outlook and mind get attuned to the difficulties of the farmer and this guides his attitude towards research. Our research workers should also visit the villages and see the cultivation practices of progressive farmers. Only by watching the work in the field they would be able to improve the farmers' agronomic practices. Thus they would be in more intimate touch with the farmers and their problems. It is also necessary that the research workers instead of depending upon farm assistants also handle some of the agricultural operations personally.

Agronomy

Although extensive research has been carried out in the past, there are still great deficiencies in our knowledge of correct agronomic practices which can be recommended to growers. Dr. A. B. Stewart, in his report on Soil Fertility Investigations in India, had particularly made a reference to these deficiencies, and had suggested that an attempt should be made to translate the results of agronomic experiments conducted on Government farms into cultivators' practices. The Indian Council of Agricultural Research prepared a scheme for simple manurial trials on cultivators' fields, but as these trials did not have a wide coverage, the results did not come up to our expectations. A revised plan has now been prepared in which provision has been made to carry out simple fertiliser trials on cultivators' fields on the basis of the existing information. The object of these trials is to prepare manurial schedules suitable for different agro-climatic regions of the country. The scheme will also help in demonstrating to the farmers the suitability of new fertilisers, namely, urea, ammonium sulphate nitrate, calcium ammonium nitrate, etc., to be manufactured in the country.

The Council has also prepared a plan of model agronomic experiments to be conducted in different parts of the country. This scheme envisages investigations on irrigation-cum-manuring the residual effects of fertilizers, rotation-cum-manuring, phosphatic manuring of legumes, fertiliser placement, seed rate, spacing, etc., and will deal with six major crops, namely, paddy, wheat, jowar, maize, oilseed and cotton. Thirty-four centres have been selected on the basis of soil-climate complex with special reference to the requirements of the river valley and other irrigation projects. The results of these experiments will enable us to make the best use of irrigation water in combination with fertilizers and other agronomic practices.

Planting Distance

It is desirable that the optimum distance between plants and between rows in respect of each crop is worked out by the Agronomists. The square and rectangular system of planting has been found useful in crops such as paddy, jowar, etc. In small holdings much work is largely done by manual labour and this system of planting can be very paying. In any case this is an item which should figure prominently in agronomical research programmes in respect of various crops.

Fertilisers and Organic Manures

During the First Five Year Plan period the consumption of sulphate of ammonia rose from 2·8 lakh tons in 1951 to 6 lakh tons in 1955. By the end of 2nd Five Year Plan period, it is proposed to raise the consumption of nitrogenous fertilizers to 18·5 lakhs tons in terms of sulphate of ammonia. No doubt, the application of nitrogen in the form of chemicals is useful but it is desirable if the chemical fertilizers are used in conjunction with organic manure. The practice of green manuring should be increasingly popularised. Cultivation of green manure shrubs such as *Sesbania* and *Glyricidia* along the boundaries of fields in suitable areas should be widely popularised. Prejudice against the use of human organic waste as manure should be conquered. It is estimated that one person yields 1 kilogram of nitrogen per annum. From this source alone 36 crores kilograms of nitrogen would be available which is equivalent to about 30 million tons. For effective utilisation of human organic waste it is desirable that a large scale programme of trench latrines is carried out in villages in the community project and N.E.S. areas. The sewage of the town which in the case of town like Bombay goes to the ocean should be utilized for agriculture. Unless man returns to the soil what he has taken from it, soil fertility would certainly go down.

Deep Water Paddy for Pits along Railway Lines

I am glad to note that there are some schemes on deep water paddy. There are a large number of pits along the railway lines in a number of States which can be used for cultivating deep water paddy. Already useful work in this direction has been done in Assam and West Bengal, and in other States also it is desirable that deep water paddy is developed. This alone will give a measurable increase in our food production.

Regional Research Stations for Horticulture

The Indian Council of agricultural Research have accepted the recommendations of the Horticulture Committee for intensification of research on the more important fruits grown in the country. According to this recommendation, the country has been divided into five agro-climatic regions so that the problems of basic research would be dealt with at the fruit research station to be developed in each region. In view of the varied nature of the problems and the number of fruits to be investigated in the different regions, a number of sub-stations will also be set up in each region in co-operation with the States concerned. The chief officer of each regional station will be primarily responsible for framing the research programme of the region in consultation with the State horticulturists and will also provide higher technical guidance. The following five Regional Research Stations will be developed:—

1. *Southern Tropical Zone*

   Main Station at Kodur (Andhra Pradesh) with a sub-station each in Mysore and Madras.

2. *Central Tropical Zone*

   Main Station at Poona with a sub-station at Nagpur.

3. *North-Eastern sub-tropical Zone*

   Main Station at Sabour (Bihar State) with a sub-station each in Assam and West Bengal.

4. *North-Western sub tropical Zone*

   Main Station at Saharanpur-Rishikesh with three sub-stations—one each in eastern Uttar Pradesh, Punjab and Rajasthan.

5. *Northern Temperate Zone*

   Main Station at Mashobra (Himachal Pradesh) with a sub-station each in the Punjab and Kashmir.

All-India Fruit Shows

All-India Fruit Shows are now being held under the auspices of the Indian Council of Agricultural Research. An Exhibition Officer (Hort.) has been appointed for this work. During the current year, two Shows have been held. The first All-India Grape Show was held at Hyderabad and the first All-India Citrus Show has recently been held at Bangalore. Another Citrus Show will be held in New Delhi about the end of December this year. These Shows are very popular with the fruit growers, attract a large number of visitors, and have provided stimulus to horticulture.

Awards for Horticulture

To encourage proficiency in fruit growing the Indian Council of Agricultural Research has formulated a fruit crop competition scheme for judging the best orchards in the country. Judging would be done not only on the assessment of the crop yield but also on the standard of fruit growing practised by the fruit grower. A uniform procedure of judging would be adopted both at the State and the All-India levels. Growers of important fruits like mango, sweet, orange (Malta, Mosambi, etc.), santra. orange, banana and apple will participate in these competitions. The best grower will be given a certificate of 'Udyan Pandit' each year, like the certificate of 'Krishi Pandit' awarded in crop competitions. He will also be awarded a cash prize of Rs. 5,000 for this distinction.

Floriculture Committee

The subject of ornamental gardening which has been very much neglected has at last been given its due place in Horticulture by the organisation of the Floriculture Committee for which step credit is mainly due, to our Minister for Food and Agriculture, Shri A. P. Jain who comes from the garden growing district of Saharanpur and takes deep interest in horticulture as well as to Dr. P. S. Deshmukh. Minister for Agriculture who has also appreciated the necessity of giving due recognition to this subject. The Indian Council of Agriculture Education at their last meeting held at Lucknow in August, 1956, recommended that landscape gardening should be introduced in the syllabi of Agricultural Colleges. As the Floriculture Committee has only recently been organised and a number of States were busy with their reorganisation plans, the number of schemes which were received for consideration were comparatively few. However, a start has been made and I believe other States will take interest in this subcjct as well. In the State of Assam with its plentiful rainfall and wide and varied flora, there is considerable scope for building up an ornamental garden with an orchid house in which collections of orchids from Sikkim, Bhutan and Assam can be placed. Apart from these, plants like Azaleas, rhododendrons and camelias exotic as well as indigenous, can also be collected in the garden. Such a collection would become very important in few years and the place where it is housed will become Mecca of botanists as well as lovers of flowers.

Animal Husbandry

Animal husbandry development, by its very nature is a more complicated and much slower process, and the results are often difficult to achieve and seldom so spectacular as in plant husbandry. Consequently, great amount of strenuous labour and patience are required not only in the planning and execution of research in animal husbandry problems but also in the application of the results of researches. Nevertheless, we must gear up our machinery for research as well as development so as to ensure that one is not divorced from the other. Thus our research programme should be realistic enough to quickly provide the answers and the techniques for the efficient implementation of our development plans, and the latter should be based on sound lines and yet be sufficiently elastic to permit of maximum advantage being taken of the knowledge and results obtained through the researches.

The ultimate goal of animal husbandry research and development is preservation of our livestock and livestock resources and their progressively increasing improvement and exploitation for the benefit of mankind. We have, accordingly, to devise ways and means of not only maintaining our animals in a state of sound health and protection from diseases but also of increasing their protective capacity as quickly as possible.

Disease Control

Some decades ago the toll taken by diseases was so heavy that it had become impossible to even think of planning and concerted programmes of improving our livestock breeds. Naturally, therefore, veterinary research in earlier years was directed chiefly towards acquiring a better understanding of animal epizootics and developing efficient methods for combating them. We may well be proud of our many achievements in that field when we recall such noteworthy examples as the progressive improvement in the methods of immunization against our livestock enemy No. 1—Rinderpest—culminating in the production of the goat tissue vaccine and the visualisation of its complete eradication from the country with the help of that vaccine, and the development of an efficient vaccine for immunizing poultry against Ranikhet disease, which had once threatened to annihilate organised poultry farming in particular and our poultry industry in general. During recent years we have seen the development of more efficacious vaccines for many other diseases, like haemorrhagic septicaemia, fowl pox, fowl spirochaetosis, which are only a little less important than Rinderpest and Ranikhet disease You have now before you a number of schemes pertaining to disease. problems, and I am sure you will agree that most of these problems deserve our immediate attention.

Rinderpest Eradication Scheme

Our 'pilot' scheme for the eradication of rinderpest, which was in operation in the southern India, has now given place to the all-India scheme for eradicating the disease from the country. The 'pilot' scheme has given us much valuable experience, and we are now confident of achieving our objective during the course of next 2 or 3 years in all the States. It is, however, important that no State should lag behind, and I trust every State Government will attend to this task with the priority that it deserves. Eradication of rinderpest from India is a project of very great magnitude, the like of which has probably not been undertaken before in any field of human endeavour. The invaluable economical and other benefits that are likely to accrue from a successful attainment of the objective, for all times to come, cannot be measured.

Animal Nutrition

In the field of animal nutrition we have already acquired a considerable amount of useful knowledge about the food requirements of our animals for maintenance of health and for the various forms of production, such as work, milk, eggs, wool etc. Researches conducted in India have taught us that the standards prescribed in western countries do not strictly apply to India, and we shall have to study all aspects of animal nutrition under the conditions obtaining in the different parts of the country and under varying conditions of climate and agricultural practices. Under a co-ordinated scheme financed by the I.C.A.R. three Regional Nutrition Research Stations have already been set up, and it is hoped a fourth station will start functioning soon. The proposals of the Second Five Year Plan also include the setting up of four Regional Livestock Research Institutes for conducting research on breeding, diseases and nutritional problems of regional importance. I believe the States are also taking necessary steps to strengthen and expand their existing research nuclei for tackling problems of strictly local importance and for introducing the application of results of researches conducted at the Central and Regional Research Institutes.

Cattle Breeding

The most noteworthy step that has been taken in recent years in the field of animal breeding is the comparative study of selective breeding and cross-breeding or grading up with better foreign or indigenous breeds, for the improvement of our non-descript and unproductive breeds of cattle, especially in hilly and heavy rainfall areas. The results of this investigation should provide a definite answer to the question: wheat breeding policy should be adopted in such areas?

You are also aware that some years ago, in consultation with the FAO experts, we had sanctioned a co-ordinated scheme on cattle sterility, primarily with the object of improving the teaching of animal gynaecology and obstetrics in our veterinary colleges and conducting investigations in diverse problems concerning infertility in cattle. The existing scheme provides for one central station and 6 regional stations located in the veterinary colleges. The officers-in-charge of the respective centres have undergone advanced training in the subject at Stockholm. There are 14 veterinary colleges in India and it is highly desirable that the cattle sterility scheme be extended to the remaining veterinary colleges also. Consequently, we have invited the remaining States to submit their schemes on sterility, and we are also persuading the F.A.O. to arrange another course at Stockholm. There is some hope that the FAO would be in a position to organise a fresh course at Stockholm in 1957-58.

Surplus-Cattle-Problem

Out of the world population of 800 million bovines India has as many as 203 million or slightly more than a quarter of the world's total. Other big countries like the U.S.S.R. or the U.S.A. have only a fraction of this number. The U.S.S.R. has only 63 million bovines and the U.S.A. 84. China has only 18 millions. India has in addition 38 million sheep and 56 million goats. Though there are as many as 26 breeds of cattle and 6 breeds of buffaloes in India, the high class animals in these breeds form only a small proportion, estimated to be roughly 10 per cent. The owners of these animals are poor and resourceless and the fodder position is extremely difficult. The available resources in feeds cannot maintain even a half of the existing population in an optimum condition of health production.

Two main purposes for which cattle are maintained in India are the production of milk and production of work bullocks. The cultivable area in India is 295 million acres. The number required to cultivate this area, assuming that their capacity is 12 acres per pair, is 24·6 million pairs. The actual number of bullocks available is 33·7 million pairs. Including the number required for carting, irrigation etc., it is estimated that the number of bullocks is much in excess of requirements. With the introduction of co-operative farming the number of bullocks required would also decrease. Mechanisation of agriculture would also in due course greatly reduce the number of bullocks required for agricultural operations. It has been estimated that about 1 lakh bullocks have already been replaced in agricultural operations by tractors and oil engines in the last five years. With increasing mechanisation of agriculture this process would gather momentum. The economy of the country is severely strained by the burden of useless cattle and it is time that we face this problem in a realistic manner so that the competition between man and animal for the limited food resources is reduced to the minimum. With the increasing population we will have to decide whether to feed the man or the unrequired animals.

Ideal Types of Cattle

A valuable suggestion that has been made to us is that for each breed of cattle and buffaloes we should lay down definite standards of an 'ideal' from the point of view of conformation and that our breeding policies should aim at achieving that ideal. A Special Committee has been constituted to examine the suggestion in detail and make its recommendations to the Council in due course.

From West Bengal has come a very interesting scheme, which aims to work out the economics of specialized dairy farming through exploitation of land for milk production rather than food-crop or cash-crop production. The nutritive value of milk needs no emphasis, and we shall watch the progress and results of this scheme with interest.

Poultry

I expect you are all familiar with our poultry development plan. Commercial hatcheries should be set up in all the States so that the development of poultry may be expedited. At present only in Madras and Travancore-Cochin States some work is being done under the schemes sanctioned by the I.C.A.R. This work should be extended in all the States. Incubators should be purchased and distributed to the Extension workers so that the people in the villages may be made to take interest in poultry development. Subject of standardised poultry feeds also require our attention. Meat of unrequired animals such as pariah dogs, cats, flying-foxes, etc., can be suitably converted into poultry feed of a highly nutritious nature. Not only this will increase egg production but at the same time these unwanted pests would be eliminated.

Literature on poultry finds an important place in our publication programme. I am glad to inform you that an excellent book dealing with all aspects of poultry husbandry has recently been prepared, and printed copies will soon be available. Moreover, our

Poultry Committee, which met last month, has drawn up a fairly exhaustive list of subjects on which we hope to produce a series of small bulletins in due course.

Sheep

As you know, the proposals of the Second Five Year Plan also include a comprehensive scheme for the development of Sheep and improvement of wool in the sheep-raising tracts of the country. Our Sheep and Wool Committee this year had under consideration a scheme for the definition, commercial evaluation and manufacturing trials of graded wools of the principal breeds of sheep. An *ad hoc* Committee has been set up to closely examine this important scheme and make its recommendations to the Council.

Technical Personnel

For a satisfactory execution of our various research and development programmes we shall require the services of a large number of suitably trained personnel. We have during the last two years or so taken adequate measures to cope with the greatly increased demand in numbers of veterinary personnel, and we are now marching ahead with our programmes of improving the quality of our personnel. As a first step, we are arranging special training seminars in anatomy and bacteriology in Calcutta and at Izatnagar during the next summer vacation for acquainting our veterinary teachers with advanced knowledge and latest coaching techniques in these subjects, and we hope to make similar arrangements for other subjects in the summer vacation of 1958. In the case of anatomy particularly we are lucky to have been favoured under the inter-institutional arrangement with U.S. land-grant colleges with the services of an expert of Dr. Grossman's eminence, and in fact he has already revolutionised the techniques of embalming etc., in his work at Bikaner. We have decided to take immediate advantage of the techniques introduced by him and we have asked the States to depute their anatomy teachers immediately to Bikaner to learn those techniques. I trust the State concerned will take the maximum advantage of these special courses which we are arranging for the benefit of their veterinary teachers.

Veterinary Education

Some of the other measures of veterinary education and research under contemplation are (a) setting up of a post graduate college at Izatnagar for providing within the country the highest possible training in certain animal husbandry subjects, (b) raising selected veterinary colleges to the post-graduate level. so that they may serve as regional centres for advanced study, and (c) setting up of regional livestock research institutes. We have already taken up correspondence with the States on these subjects, and we expect all the States will make the best use of these programmes.

Tribute to Dr. P. N. Nanda

As members are aware, Shri P. N. Nanda, our Animal Husbandry Commissioner has proceeded on leave preparatory to retirement. When he joined the Council in 1947, he had behind him a wide and varied experience of several years as a Divisional Officer, as Superintendent of the largest livestock farm in the East and as Director of Veterinary Services in two major States. He brought this rich knowledge and experience to bear on the work of the council and on the deliberations of this Board and its various Committees. His services to the Council and the country at large have been invaluable, and we all deeply appreciate the good work he has done. He was a pleasant colleague, and a good worker, who had developed an All-India view of animal husbandry problems of India and his departure on retirement is a very severe loss indeed to the Council. Let us hope his knowledge and experience would be available to the country in some other capacity.

Publications

I am glad to note that the Indian Council of Agricultural Research have made considerable progress in their publication programme. An excellent monograph on Rice has just been printed. A monograph on Mangoes, a book on Ornamental Flowering Trees are in the press. Books on Poultry and Horticulture will be sent to the press by the end of next month. Monographs on Cotton, Jute, Coconut, Tobacco and various Oilseeds would be ready by the close of next year. A series of monographs on Algae and Fungi have been planned and I hope these would also be available by the end of next year. A new magazine on Horticulture has been started and has been greatly appreciated by those who are interested in gardening. The quality and lay-out of books and journals has been improved and I hope when the publication programme of the I.C.A.R. is successfully implemented, a great step in agricultural education would have been taken. In fact, by providing a series of books on agriculture and animal husbandry, the I.C.A.R. will be laying the foundation of a sound agricultural education based on local material and talent. These books are only required in India but would also be of use in other countries of Far-Eastern region where the problems of agriculture are similar.

Very creditable work has been done in giving a push to our publication programme by Dr. B. N. Uppal, our Agricultural Commissioner, and Shri P. N. Nanda, our late Animal Husbandry Commissioner. I also appreciate the interest which has been taken by Dr. B. L. Sethi, Secretary, Indian Central Cotton committee, Dr. P. J. Gregory, Secretary, Indian Central Coconut Committee, and Dr. R. Sankaran, Secretary, Indian Central Oilseeds Committee, in the publication programme of their Committees. I also appreciate the good work done by Shri M. G. Kamath, Editor, Indian Farming, and Shri Prem Nath, Editor, Books, who ably edited our books and publications. I also appreciate the work done by the Art Section under the direction of Shri N. S. Bisht in providing artistic lay-outs for our publications. Dr. P. S. Deshmukh, Minister for Agriculture, has taken keen interest in our publication programme and his encouragement has provided stimulus to us in our publication programme; and I thank him cordially for his patronage.

APPENDIX II

General recommendations made by the Scientific and Commodity Committees at their meetings held in April and October 1956

FLORICULTURE COMMITTEE

The suggestions made by Shri Bhanu. L. Desai in his note submitted to the Chairman were considered item by item as follows:—

(a) *Multiplication of annual flower seeds*

(i) The Chairman said that the suggestion to take stock of the existing species, varieties and strains before undertaking multiplication of the seeds was a sound one. He suggested that it should be kept in view while revising the U.P. scheme as decided in Subject No. 3.

(ii) The Chairman suggested that the work of multiplication of bulbous plants should be taken up in the Punjab/PEPSU scheme *vide* Subject No. 4.

(iii) The Chairman suggested that nurserymen, private growers and seed merchants should be encouraged to form themselves into societies and to specialise in particular types of plants, bulbs, shrubs, flowers, etc.

Shri M. L. Garg pointed out that great difficulty was felt by private importers owing to custom formalities, fumigation arrangements etc., and often delay that took place resulted in the death of the living plants. The Chairman said that the I.C.A.R. would try to help in this matter and would even depute an Officer to the ports, custom barriers etc., to arrange for the expeditious release of the plant material being imported and exported.

Dr. Pal remarked that fumigation arrangements had been made at Bombay, Madras, Calcutta and Delhi. The Chairman suggested that a representative of the Plant Protection Organisation (on the fumigation side) might be placed on the Floriculture Committee and that the entire matter should be examined by a Sub-Committee consisting of Dr. Uppal, Dr. Pal, Shri S. M. Rao, a Representative of the Custom Department and a Representative of the Plant Protection Organisation.

Shri Rao pointed out that in some other countries special kind of packing called "Wardian Case" was being used to protect the plants in transit. The Chairman said that this might be brought to the notice of nurserymen.

(iv) As regards maintenance of standards of purity, Dr. Pal said that the seed testing laboratories which were proposed to be set up would also undertake work relating to flowers seeds etc.

(v) The Chairman suggested that the question of cut flowers business might be examined by a Sub-Committee consisting of the following persons.

1. Shri Percy Lancaster (Chairman),
2. Shri S. M. Rao,
3. Mrs. W. F. B. Price,
4. Mrs. Devi Chand Sawhney,
5. Shri Bhanu. L. Desai,
6. Shri M. L. Garg,
7. Shri P. L. Malhotra.

Concrete proposals should be drawn up and submitted to the Committee for consideration thereafter.

(b) *Research and Education*

(i) The Chairman suggested that students in the Agricultural Colleges should be encouraged to take up research on problems connected with culture of exotic as well as indigenous ornamental plants and that recommendations to this effect should be circulated to the colleges concerned.

(ii) The Chairman suggested that schemes for trials with suitable grasses for lawns—both indigenous and imported should be invited for consideration by the Committee.

(iii) The Chairman suggested that Agricultural Colleges should be advised to collect literature on ornamental horticulture landscape gardens etc., as part of the their reference Libraries.

(iv) Shri Desai agreed to write a book on "Annuals and Bulbs". The Chairman suggested that the book should be completed and submitted in six months time.

(v) The Chairman suggested that articles on introduction of new species and strains of flowers and ornamental plants, their cultivation etc., should be included in the "Indian Horticulture".

(iv) Shri Desai agreed to write a book on "Annuals and Bulbs". ment of an Institute in Landscape Architecture and Oranmental horticulture or an intitution of Diploma or Refresher Course might be postponed for the present.

(vii) The Chairman suggested that the question of establishing a Museum might be examined by the Sub-Committee recommended under item (1)—(v).

(viii) The Chairman suggested that an authentic list of nurserymen, seed growers, plant growers etc., with details of flower grasses, vegetable seeds, bulbs plants etc., imported and exported by them might be compiled by the I.C.A.R.

(ix) The Chairman suggested that a film on "Gardens of India" might be prepared by I.C.A.R.

The Committee approved of the above suggestionsand recommendations.

Dr. Pal suggested that a survey should be made of the material available in the country which is suitable for propagation. He said that flower trees and forests were being ruthlessly cut and the orchid wealth of the country was being reduced. The Chairman suggested that the matter should be brought to the notice of the authorities concerned with the object of discouraging unrestricted export of orchids. He also suggested that the National Botanical Gardens, Calcutta might also be asked to build up a collection of these flower trees. These suggestions were approved by the Committee.

Mrs. Sawhney suggested that Shri S. Percy Lancaster should also be made a member of the Floriculture Committee. This was approved.

The Committee recommended that an officer of the I.C.A.R. should be specifically placed incharge of the work of Floriculture. The Chairman said that this might be assigned to Dr. Sham Singh, Assistant Agricultural Commissioner.

The Committee recommended that the Sub-committee appointed under item (1)—(v) should also consider ways and means of helping outstanding private nurseries like the "Chandra Nursery, Kalimpong" and saving their important collections.

The Chairman suggested that Dr. Pal and Shri S. M. Rao might prepare a scheme for beautification of Archaeology monuments.

HORTICULTURE COMMITTEE

The Committee recognised the very unsatisfactory nature of the figures relating to the average production and distribution of fruits in the country and believed that it is of utmost importance to improve these statistics by either establishing a new agency or strengthening the existing agencies for collection of such data. In view of the fact that under the Second Five Year Plan an intensive horticultural development work is contemplated, the Committee recommended that this work should be assigned to the development staff, if necessary by phasing the work to cover the entire union in gradual stages.

In view of the fact that some of the information contained in the Annual Reports are being quoted unauthorisedly, the Committee recommends that all published or cyclostyled Progress Reports of the schemes should future have the following words clearly printed or cyclostyled on the cover page as "For official use only".

It is ascertained that handbook containing the instructions for the preparation of research schemes, technical programmes and reports, issued by the I.C.A.R. have not yet been distributed to the workers in charge of the different research schemes. In order that these instructions may be followed in future, copies of these handbooks may be sent to all workers who are incharge of the various I.C.A.R. schemes.

The P.E.P.S.U. report on "Ber" fruit scheme has suggested a system of numbering plants for facility in recording and identification in order that a standardised procedure either in the form adopted at P.E.P.S.U. or with certain modifications thereof may be adopted in all the fruit research stations. The Committee recommends that this question should be examined during the next session of this Committee, after referring to the recommendation of the International Horticultural Congress which went into this question recently. As soon as the copies of the proceedings of the International Horticultural Congress on this question become available, the I.C.A.R. may appoint a Sub-committee of the Horticultural Committee with Head of the Division of Botany at I.A.R.I. as one of the members to make suitable recommendations in this regard for consideration of the next Horticultural Committee.

Since all the Progress Reports are expected to be recieved by the Council by the end of August every year and are to be considered during the spring meetings in the following year, the Committee recommended that this long period could be utilised for obtaining the comments of the specialist referee which, together with the report, should be circulated at least a month before the session of the meeting.

The Horticulture Committee felt that while preparing the annual progress report of work, it was necessary that not only the sanctioned annual programme of the previous year should be furnished, but the proposed programme of work for the following year should also be given at the same time in as detailed a manner as possible to enable the Committee to examine if the proposed programme is a follow-up of the work previously done. If this is done, there would be no need for submitting a separate annual technical programme for the consideration of the Committee. These recommendations would apply only to crops like vegetables where the programme has to be changed sometimes from year to year. In the case of perennial crops there is no necessity to submit annual programmes, as no change in the lay-out plans or procedure is involeved.

After a detailed discussion on the rapid deterioration of mango, mandarin and some other citrus orchards in the Country, the Committee urged that detailed survey by virus expert of the leading citrus producing regions of the country and of areas where mango malformation was common, was necessary in order that the possibility of intensifying research for securing a quick solution to the problems may be determined. The Head of the Division of Mycology, I.A.R.I. may, therefore, be requested to depute one virus expert for this survey as early as possible so that a report on the basis of on-the-spot study could be available for consideration at the next meeting of this Committee. If considered necessary, a definite scheme for intensifying work on these maladies may also be invited from the Head of the Division of Mycology along with the above report.

Problems of the fruit and vegetable canning industry

(i) Introduction of seedless varieties of mandarin oranges should be taken up in order to see how far such varieties could be profitably grown under our conditions to suit the canning industry.

(ii) In the case of mandarin oranges where more than one bahar is being attempted, the Committee recommended that the possibility of standardising the maturity and the size of the seed in each bahar to suit the mandarin canning industry, should be investigated. Work should also be taken up to find out the possibility of fostering the type of seed that would render the canning process, more convenient and economical.

(iii) In all research stations dealing with mangoes, the Committee recommended that the optimum standards for picking of fruit and the process of ripening the same under different storage conditions should be worked out, in order that the quality of fruit may be of a standard suitable for canning purposes.

ENTOMOLOGY AND ANIMAL PESTS OF CROP COMMITTEE

General Recommendation

The Committee felt that mites, aphids, White flies and jassids constituted some of the serious pests of agricultural crops in the Indian Union and unanimously recommended that a Sub-Committee consisting of the Chairman and Dr. H. S. Pruthi should draw up well thought out schemes on the systematics, biology and control of these pests, taking into consideration the experts available in the country and the necessary laboratory facilities and submit the proposals to the Indian Council of Agricultural Research for urgent consideration at an early date.

Agricultural Engineering Committee

The Committee recommended that the following list of subjects may be included in the purview of the Agricultural Engineering Committee for the recommendation of research schemes to the Indian Council of Agricultural Research:—

1. Farm structures and grain storage.
2. Rural housing.
3. Lift irrigation and farm and domestic water supply.
4. Principles of application of irrigation water to farm land.
5. Farm drainage.

Animal Breeding Committee

(1) The Chairman pointed out that the reports of the State Departments of Animal Husbandry were to be considered by this Committee along with the reports of Central Institute so that full coordination may be effected and duplication may be avoided. It is to be regretted, however, that in spite of repeated requests, the State Departments were not able to submit even an advance copy to the Indian Council of Agricultural Research.

(2) Hereafter the report of the breeding Section of the National Dairy Research Institute should be considered by this committee also.

(3) The following are tentative items on which schemes should be prepared. The authors are indicated against the items:—

(1) Marketing of Livestock
Products—to be taken up by all State.
{ In this connection a copy of the U. P. Marketing Act may be obtained and studied. }

(2) Application of sampling technique to Animal Husbandry data
——— Shri Amble.

(3) Thickness of skin and distribution of sweet glands in relation to milk production of buffaloes
——— Dr. Bhattacharya.

(4) Assessment of Economic value of livestock in India.
——— Mr. Amble.

(5) Spreading out of calving season of buffaloes
——— Mr. Amble and
Dr. Bhattacharya.

(6) Histological Studies on skin of livestock
(Different breeds)
——— Mr. Khot.

(7) Simplified method of progeny testing.
——— Dr. Amble and
Dr. Bhattacharya.

(8) Study of Physiology of hump and dewlap.
——— Veterinary College, Mathura and
West Bengal.

DAIRY SCIENCE COMMITTEE

I. *Additional problems suggested by the Committee*

Shri D. N. Khurody referred to several technical problems facing the dairy industry which called for urgent investigation at the Dairy Institute and also made a number of suggestions for bringing about greater co-ordination between the industry and research workers.

(1) *Co-ordination between the research workers and the industry*

The Committee approved the suggestion that the officers of the National Dairy Research Institute should periodically visit important milk processing and other dairy centres in the country, *e.g.*, Aarey Milk Colony, Kaira Milk Union, etc., and discuss with the staff the technological problems encountered by them for being investigated at the Dairy Institute.

(2) *Chemical standards for market milk*

The need fo rdefining appropriate standards for fat and solids-not-fat contents of market milk so as to satisfy the nutritional requirements of the people consistent with their dietary habits was emphasized. Owing to the existence of different kinds of milk in the market, *e.g.*, cow's and buffaloes' milk, toned milk recombined milk, etc., which varied considerably in their fat and S.N.F. contents apart from other compositional differences, it was very important to lay down such standards in order to safeguard the health of the population while ensuring the economic utilisation of the existing resources. The Chairman stated that this kind of work could be undertaken at the National Dairy Research Institute, Karnal only after the Dairy Nutrition Division of the Institute was established and fully equipped.

(3) *Milk feeding in Schools*

The attention of the Committee was drawn to the importance of prescribing the composition of milk to be used for feeding school children. The Chairman was of the opinion that this kind of work came within the purview of the Ministry of Health. It was also understood that the various projects concerned with the supply of milk to school children in the country and the associated problems were now engaging the attention of the Ministry of Education.

(4) *Fortification of low fat milk with Vitamin A*

A reference was made to the importance of undertaking studies on the fortification of low milk, fat milk and skim milk with Vitamin A to improve its nutritive value. The Chairman pointed out that considerable amount of work had been done at the Dairy Institute and the results were published in series of articles in the Indian Journal of Dairy Science. The stability of synthetic Vitamin A added to milk had also been examined. Synthetic Vitamin A preparation (fat or water soluble) was supplied by M/s. Hoffman La Rouche through their agents Voltas Ltd. If necessary, a note giving full particulars of the process would be given to the Milk Commissioner, Bombay, who was interested in the subject.

(5) *Homogenisation of milk*

The need for carrying out studies on homogenisation of milk under Indian conditions using different pressures and the effect of such homogenisation on the curd making properties of milk was expressed. The National Dairy Research Institute at Karnal was expecting to get a small experimental homogenisation plant under one of the foreign aid programmes and when that plant was put in operation, this work could be taken up.

(6) *Problems of commercial ghee making*

It was felt that there were a number of problems in connection with commercial ghee production which called for solution and that although research work on ghee has been in progress for quite a long time, the results had not been applied for the improvement of the ghee industry. There was need for standardising the process of manufacture and of improving the ghee refineries in particular. The ghee industry in U.P. which was organised to some extent, offered great scope for the application of results of research work. It was also pointed out that the huge amount of data obtained in earlier investigations on the subject have not been properly reported or utilised. Dr. S. C. Ray referred to the magnitude of the problem and the work done by the Dairy Institute in collaboration with ghee industrialists at Tripur. In the course of the discussions, the present lacuna in regard to extension services for undertaking study of field problems and lack of organised efforts to apply the results of research work in the field came in for some criticism.

The Committee made the following recommendations:—

(a) A special committee should be appointed by the Indian Council of Agricultural Research to go round the ghee producing and refining centre in U.P., study the present conditions and make necessary suggestions.

(b) A comprehensive note on the research work on field investigations carried out in connection with ghee during the last 25 years should be prepared for guidance in undertaking steps for improving the industry and for planning further research work.

(c) It was very necessary that the Dairy Development Officers of various States, Marketing Officers and dairy research workers should meet at the National Dairy Research Institute at least once a year to discuss the progress of the Industry in the problems to be investigated, etc., and to establish greater contact between research workers and development staff.

(7) *Milk Products Factory, Anand*

A special reference was made to the new dairy enterprise that had been established at Anand by the Kaira District Co-operative Milk Producers Union and it was felt that the workers of the National Dairy Research Institute should visit the centre to study the processes and manufacturing problems and give suitable suggestions for improvement. This study would be of importance to the whole country. In this connection Shri Kurien, Manager, Kaira District Co-operative Milk Producers Union, Ltd., explained that a bacteriological quality control programme was in operation at the Union under a research scheme financed by the Indian Council of Agricultural Research and that the programme had been of great help in preparing good quality products.

(8) The desirability of fixing a time limit for the completion of investigations and of issuing interim reports on the results obtained periodically for the guidance of the trade was expressed. The Chairman explained the various difficulties involved in adopting a generalised procedure for the purpose.

II. *Problems recommended by the Board of Research*

(1) The Animal Husbandry Commissioner presented a list of eight problems of research in dairy science recommended by the Board of Research of Indian Council of Agricultural Research in previous years and suggested that they should be taken into consideration in drawing up the programme of research work.

(1) *Clean milk production*

It was stated that considerable amount of information on this aspect had been obtained in the course of the investigations on bacteriological survey of market milk sponsored by the Indian Council of Agricultural Research. One such Scheme was now running at Anand. and two more were sanctioned for Calcutta and Delhi. During the working of these Schemes, data regarding sources of infection in milk, etc., would be collected and the effect of introducing improved measures for clean milk production would also be observed.

The Committee approved the idea of starting similar schemes of bacteriological survey of milk at two other centres, *viz.*, Allahabad and Vizagapatam. The work at Allahabad should be undertaken by the Agricultural Institute in co-operation with the Dairy Development Officer of U.P. In regard to Vizagapatam, the scheme could be worked out at the new dairy laboratory proposed to be established by the Animal Husbandry Department, Andhra State, there. Model schemes should be prepared and sent to these two centres for suitable modifications and submission to the Indian Council of Agricultural Research.

(2) *Quality of milk produced in vilages, etc.*

This is covered under item (i) above.

(3) *Simple methods of detection of adulteration of milk and milk products*

It was felt that considerable amount of work had already been done on the subject and the available information should be properly assessed before undertaking further investigations. Dr. N. N. Dastur, National Dairy Research Institute, might be requested to prepare a review of the work done in India as well as abroad in connection with the development of simple methods for detecting adulteration of milk and milk products.

(4) *Simple methods for improving keeping quality of milk*

This aspect has also been covered under item (i) above.

(5) *Introduction of sterilized milk in India*

The Indian Council of Agricultural Research has just sponsored a research scheme on the subject to be worked at the Haringhatta Farm, Calcutta, and the results of this study might be awaited.

(6) *Bacteriological survey of milk*

Covered under item (i).

(7) *Recovery of lactose from channa whey*

This problem is to be investigated at the National Dairy Research Institute. The Commmittee noted the suggestion that some work in this direction could be undertaken at the Kaira District Co-operative Milk Union, Anand, and also at the dairy factory to be established at Patna

(8) *Studies on Chilling of milk*

It was pointed out that considerable amount of work in this direction had been carried out at the Bangalore Dairy Institute in the past and that satisfactory methods of chilling were being practised at the Co-operative Milk Supply Unions at Lucknow and Banaras. Some work on the designing of a chilling plant was also in progress at the Kaira Co-operative milk Union. It was, therefore, felt desirable to collect information on the different methods already tried out and work out their economic, etc. It was suggested that the Indian Council of Agricultural Research should depute qualified person to study the different methods of chilling being practised or investigated at different centres and prepare a comprehensive note on the subject within a period of three months.

NUTRITION COMMITTEE

1. The Central Fodder and Grazing Committee and its counterparts in the States should be revived as early as possible. This is in accord with the recommendations of the Animal Husbandry Wing Meeting held at Ranchi and accepted by the Council. These Committees should include representatives of various scientific interests.

2. An Animal Nutrition Adviser be appointed at the centre to advise on all matters in relation to animal nutrition research and development of animal feed. He should also co-ordinate the work on animal nutrition in the States and Centres.

Animal Diseases and Pests

The Committee felt handicapped in considering extension proposals and technical programmes thereunder if report on the last year of the sanctioned period of the scheme were to be considered in March—April next. In such cases, the Committee desired, the report on the last year of the sanctioned period of the scheme might be put up simultaneously for consideration in future.

HIDES AND SKINS COMMITTEE

At the suggestion of Dr. H. D. Srivastava, Head of the Division of Parasitology, Indian Veterinary Research Institute, Izatnagar, the Committee recommended that since the scheme of research on damage caused by biological factors to hides and skins in India had been taken over by the Government of India from the Indian Council of Agricultural Research, Mr. B. N. Soni might be asked to write a monograph on the research work carried out by him under the Council's scheme.

POULTRY COMMITTEE

1. *All-India laying Trial*

It will be seen from the minutes of the Annual General Meeting of the Indian Poultry Club held on the 2nd March 1956 at Nagaur Rajasthan that the entrance fee of Rs. 25 per entry should be reduced to Rs. 5 as this would induce more breeders to send in their birds. Another point brought out was that the eggs produced in the laying trials should be sold at table rates and the amount paid to the respective competitors.

The Committee discussed the above points at length and felt that the question of reducing the entrance fee might be reviewed if necessary, after seeing the response to the next annual Laying Trial and that it would not be reasonable if the sale proceeds of the eggs were to be paid to the respective competitors as the entire cost of the scheme and that of feeding charges were being borne by the Council.

2. *Publicity*

The Committee felt that a more attractive get-up of the Indian Poultry Gazette with suitable illustrations and popular articles is immediately necessary and therefore recommended that the Council should consider the feasibility of subsidizing the extra cost thereby involved by the Club.

other subjects discussed included

(a) Cheap poultry houses
(b) Economic poultry rations
(c) Vaccination of day-old chicks against R. D. & F. P.
(d) Establishment of model poultry farms at each of the veterinary colleges for research cum training purposes.

The Committee endorsed the view of the Council that all the above subjects were of fundamental importance for the implementation of the All-India Poultry Developmental Project and accordingly recommended that the following Officers should be requested to draft a model scheme and submit the same to the Council within a month for circulation in the different States:—

Shri R. M. Patil—Cheap Poultry houses.
Dr. S. Bose—Economic Poultry ration.
Shri M. R. Dhanda—Vaccination of Day old chicks against R. D. & F. P.
Shri S. G. Iyer—Establishment of model Poultry farms at Veterinary Colleges.

New items of research for Poultry. (List enclosed)

As several of the Poultry Development Officers who are members of the Committee were absent the Committee recommended that the the P. R. Division, Indian Veterinary Research Institute, should be requested to circulate the information amongst the different Poultry Officers in the States and also to afford necessary help in this direction for preparing suitable schemes.

3. *Item of Research for Poultry*

(i) Develop and apply random sample tests for comparing the performance of different strains of poultry.
(ii) Develop and apply progeny testing methods for selection of breeding cocks.
(iii) Investigate possibilities of correlation between physical body characteristics and performance—egg production, egg size, hatchability, viability of chicks etc.
(iv) Investigate possibilities of correlation between egg size and growth rate of embryos and chicks.

(v) Study improvement of hatchability by providing special temperature and other conditions during the last three days or so of incubation of poultry eggs.

(vi) Improvised satisfactory methods for rearing late-hatched chicks.

(vii) Commercial hatcheries in Poultry.

WOOL COMMITTEE

The research stations should have sufficient number of experimental sheep so that tangible results can be obtained and can contribute substantially to the development of sheep industry. A unit of at least 500 breeding ewes should be established. If sufficient area is not available at one place, the main station should have sub-units located in the sheep breeding zone.

2. The annual reports of the scheme should be presented to the Wool Committee in the first meeting of the year *i.e.*, in October/November otherwise there is a considerable lapse of time before the results are obtained for scrutiny. Hence it is recommended that the officers in charge should prepare their draft reports by the middle of May and submit these immediately to the Co-ordinating Officer (Sheep and Wool). The officers in charge should also be sent to the I.C.A.R. in the first fortnight of June for finalising the draft reports in consultation with the Statistical Branch and the Co-ordinating Officer.

3. There should be museum in the Council where wool and cloth samples produced at the regional research stations, a few essential instruments, photographs, charts etc., would be exhibited for purpose of demonstrating the position of sheep breeding research programmes undertaken in the country.

4. Importance should be given to the study of the skin follicles and training course for the officers in charge of wool laboratories should be undertaken in this subject.

5. A committee for standardising the methods of fleece testing should be appointed to lay down methods to be followed in the different wool laboratories sponsored by the Council.

6. Washing of sheep before shearing should be popularised wherever it is not done.

7. A Committee may be appointed to consider the problem of classing of Indian wools on the basis of quality.

8. The problem of breeding sheep to suit a mixed farming economy has not yet received the attention it deserves. In view of the large scale projects to be undertaken in the country for expanding the irrigation facilities and the development of intensive agriculture, it is considered imperative that high wool and meat yielding sheep, which can live on small farms should be evolved. It will be necessary also to train an expert and appoint him on the staff of the Council to implement a research programme to deal with this important aspeet of sheep industry.

9. Steps should be taken in working out simple methods of scouring of wool which can be appropriately carried out in rural conditions.

10. There cannot be any progress in the spinning quality of wool in the villages unless provision is made to help the spinners with blended laps or rovings of uniform quality. This can only be done if appropriate small-scale machinery is provided. If necessary, trials in evolving small carding plants may be undertaken under the auspices of the All India Khadi and Village Industries Board.

STATISTICAL COMMITTEE

On an enquiry from the members of the Committee as regards pilot surveys on cardamom and cashewnut, the Committee was informed that although these two schemes had been formulated on the suggestion of the Spices Enquiry Committee, they were not recommended by the Central Spices and Cashewnut Committee felt that, as the cashewnut and cardamom were of considerable commercial importance and peculiar sampling problems, suitable techniques should be evolved for estimating their production. The Committee also felt the need of evolving suitable sampling techniques for estimating the production of other important minor crops, like fruits vegetable etc.

PUBLICATIONS COMMITTEE

(i) During the general discussion the chairman pointed out the difficulties of retired scientists who were entrusted with the preparation of manuscripts for the Council. They as a rule do not generally have office facilities and were rather handicapped in their work. The Committee decided that in such cases the help of a stenographer should be provided by the Council for a period not exceeding six months.

(ii) There was also a general discussion relating to the amount to be paid as honoraria to authors for accepted manuscripts. It was decided that the amount of honoraria in each case would be decided by V. P. in consultation with the Commissioners. The quality of work should be the criterion in deciding the amount of honoraria in each case and not the bulk of the manuscript. It was also decided that honoraria should be paid to the authors as soon as the manuscripts were accepted.

(iii) It was decided that textbooks for extension workers should be published by the Indian Council of Agricultural Research and suitable budget provision should be made for this purpose. It was also decided that these textbooks would be translated in regional languages and in this connection Dr. Patel was requested to furnish information relating to the number of development blocks in each language group. In this connection, it was decided that these books should be supplied to all development blocks in the country and funds should be provided for this purpose from the lump sum grant sanctioned by the Community Project Administration for the supply of publications. If any curtailment was to be made on account of limitation of finances, it should be effected in the sphere of supply of periodicals so that flow of books as envisaged was not disturbed.

APPENDIX III

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Consolidated Proceedings of the meeting of the Scientific and Commodity Committees held in October 1956

SECTION B TO L

B—BOTANY AND PHYSIOLOGY

SUBJECT NO. B-1

BLAST RESISTANT VARIETIES OF PADDY—WEST BENGAL (NEW SCHEME)

Eastern Regional Committee

The Committee did not recommend the scheme, but suggested that preliminary study might be carried out by way of collecting the material and assessing their worth under Bengal field conditions and only later a fuller scheme might be evolved.

Botany Committee

The remarks of the Eastern Regional Committee were endorsed.

SUBJECT NO. B-2

INDUCTION AND STUDY OF AMPHIPLOIDY IN RICE—WEST BENGAL, NEW SCHEME

Eastern Regional Committee

The Committee was of the view that the scheme may be referred to the Director, Central Rice Research Institute, to ascertain whether the type of work envisaged in the scheme was already being done there or whether it was necessary to do any additional work in this direction at the Presidency College, Calcutta. The Botany Committee would then examine the scheme in the light of the reply received from the Director, Central Rice Research Institute.

Botany Committee

The scheme was recommended subject to the remarks that at the time of submission of the technical programmes it should be seen, that there was no unnecessary duplication with the programme of work of the Central Rice Research Institute. It was suggested that Dr. P. N. Bhaduri may be invited to the next meeting of the Botany Committee when the programmes would be discussed and when the Director, Central Rice Research Institute would be present. The provision of the staff etc., would also be reviewed at that time.

SUBJECT NO. B-3

BREEDING OF DROUGHT RESISTANT STRAINS OF PADDY—WEST BENGAL, NEW SCHEME

Eastern Regional Committee

The Committee was of the view that unless the work on determining criteria for resistence which was being carried out at the Central Rice Research Institute was completed, no further work of this nature should be done in the States. The Director, Central Rice Research Institute should, however, be requested to expedite the work that was being done there so that the work in the States was not held up.

Botany Committee

The Botany Committee agreed with the recommendations of the Eastern Regional Committee.

SUBJECT NO. B-4

IMPROVEMENT OF HILLY PADDY—NEW SCHEME—U.P.

Eastern Regional Committee

The scheme was recommended on the conditions that the programme of work was confined only to the breeding aspects.

Botany Committee

The Botany Committee agreed with the remarks of the Eastern Regional Committee and recommended the Scheme subject to the work being restricted to the breeding operation only. It was also recommended that the scheme should be so worked that the results may be useful to other rice growing regions in the hills also. It was further suggested that some of the high yielding China paddies should be given a trial in view of the exceptionally heavy yields obtained with them in Kashmir.

As regards the budget, it was recommended that the clerks may be provided by the State Government. T. A. should be Rs. 750 for each of the first two years, and later on Rs. 500 per annum. The experimental area should not exceed 10 acreas and the contingencies should be reduced correspondingly.

SUBJECT NO. B-5

IMPROVEMENT OF LAND PADDY—NEW SCHEME

Eastern Regional Committee

The Committee did not recommend the scheme as it felt that the work envisaged in the scheme formed part of the normal activities of the State Agricultural Department.

Botany Committee

The Botany Committee agreed with the Eastern Regional Committee and did not recommend the scheme for sanction.

SUBJECT NO. B-6

INVESTIGATIONS OF DEEP WATER PADDIES—NEW SCHEME —U.P.

Eastern Regional Committee

The Scheme was recommended subject to the Scrutiny by the Scientific Committee.

Botany Committee

The Committee recommended the Scheme subject to the proviso that when the technical programme is called for, the State Government should be asked to say how exactly the work would be organised at the two centres and how the staff would be distributed between them. Regarding budget it was recommended that the provision of T. A. in each of the first two years should be Rs. 750 and Rs. 500 per annum in subsequent years. Only one clerk was considered necessary, provision of which may be made by the State Government.

SUBJECT NO. B-7

DRY LAND PADDY AND BORO PADDY—NEW SCHEME—U.P.

Eastern Regional Committee

The Committee recommended the scheme on the condition that the work was confined to the breeding aspects. It further laid down that details of contingent expenditure and the receipts accruing from the scheme should be furnished before the Scientific Committee meeting.

Botany Committee

The Botany Committee recommended the scheme on a 50:50 basis but suggested that work under this scheme should be restricted to Boro paddy only. As regards staff, it was recommended that only one Field Assistant may be provided in place of three asked for in the Scheme. The contingent grant may be reduced from Rs. 4,400 to Rs. 1,500 per annum. The Committee was informed that an income of Rs. 500 per annum was likely to accrue from the second year of the Scheme. This amount may be shared by the I.C.A.R. and the State Government on a 50:50 basis.

SUBJECT NO. B-9

CYTOLOGICAL STUDIES IN MAIZE AND SORGHUM—NEW SCHEME—ANDHRA UNIVERSITY

The Southern and Coastal Regional Committee, suggested that this scheme should be carefully scrutinised by the Botany Committee with regard to the programme of work as also the contingent expenditure. If the Botany Committee felt that the programme outlined in this scheme was already included in the Co-ordinated Maize Research Scheme, this scheme need not be approved. If, however, the work proposed was likely to be complementary to the studies envisaged in the co-ordinated maize scheme, the proposal might be sanctioned for five years. The State Government may, however, be asked to clarify as to who would be the officer-in-charge of this scheme before the Scientific Committees met in October this year.

Botany Committee

A large portion of the work contemplated under the Scheme would be covered by the co-ordinated maize and millet scheme which is coming into operation, but since Prof. Venketsavarlu has been working on the same subject, and since he has built up useful genetic material, it would be worthwhile to give him some assistance to continue the work till the new regional centres start functioning. The Botany Committee, therefore, recommended the sanction of the scheme for three years subject to the reduction of staff to one Research Assistant, one Field *cum*-Lab. Assistant and one Mali and of contingencies to Rs. 2,000 per annum.

SUBJECT NO. B-10

SCHEME ON INVESTIGATION ON DROUGHT RESISTANCE IN WHEAT—NEW SCHEME—MADHYA PRADESH

Southern and Coastal Regional Committees

The Committee recommended the scheme on the usual basis with the modification that the T.A. grant should be reduced from Rs. 1,500 to Rs. 750.

Botany Committee

The Committee agreed with the recommendations of the Southern and Coastal Regional Committee and recommended that the Scheme may be sanctioned for a period of three years on a 50:50 basis. As regards the budget, it was suggested that the T.A. grant should be reduced from Rs. 1,500 to Rs. 750 per annum.

SUBJECT NO. B-11

BREEDING OF RUST-RESISTANT VARIETIES OF WHEAT—WEST BENGAL (NEW SCHEME)

Eastern Regional Committee

The Committee recommended the scheme subject to the condition that it formed a sub-centre of the co-ordinated scheme on rust resistant varieties of wheat already sanctioned by the Indian Council of Agricultural Research.

Botany Committee

The Committee approved of the Scheme but recommended that the work should be restricted only to one centre in the D.V.C. area and that the staff of the scheme should be curtailed to one Assistant Botanist, one Botanical Research Assistant, one Fieldman, one Laboratory Attendant, one Peon, and Chowkidar. The contingencies should be reduced from Rs. 2,500 per annum to Rs. 1,200 per annum. The T.A. grant should be Rs. 750 in each of the first two years and Rs. 500 per annum in the subsequent three years.

As regards the non-recurring contingencies it was recommended that the entire cost should be met by the State Government. The pay of the typist-*cum*-clerk should also be met by the State Government.

SUBJECT NO. B-12

SCHEME FOR THE EVOLUTION OF SUPER DROUGHT RESISTANT AND EXPLOITATION OF HYBRID VIGOUR IN SORGHUM

Eastern Regional Committee

The scheme was not recommended as a co-ordinated scheme on millets already sanctioned by I.C.A.R. would deal with the work proposed in the scheme.

Botany Committee

The Botany Committee agreed with the recommendations of the Regional Committee that the work contemplated in this scheme should be carried out by the regional centre which is proposed to be set up at Coimbatore under the co-ordinated millet scheme.

SUBJECT NO. B-13

HYBRID SAJJA (BAJRA) PRODUCTION AND DISTRIBUTION SCHEME—ANDHRA

Eastern Regional Committee

The Committee did not recommend the scheme as I.C.A.R. has already sanctioned a co-ordinated scheme which would deal with the work proposed in the scheme.

Botany Committee

The Botany Committee did not recommend the scheme at present, because suitable inbreads, etc., had not been yet developed in the State. It was, therefore, desirable to wait for more experience to be gathered under the existing scheme in Madras State and also to await the recommendations of the Rockefeller Foundation Experts, who are to come to India to advise on the organisation for hybrid seeds production.

SUBJECT NO. B-14

SCHEME FOR RESEARCH IN GENETICS OF SORGHUM

Southern and Coastal Regional Committee

The Committee recommended that this scheme should form part of the scheme on the regionalisation of sorghum research".

Botany Committee

The Botany Committee noted that the suggestion made by the I.C.A.R. for sending the Scheme through the Madhya Bharat Government, had not been implemented. The committee did not recommend the scheme because it was not drawn up according to the instructions issued by the Indian Council of Agricultural Research and the Committee found it difficult to express any opinion upon it in its present form.

SUBJECT NO. B-15

CO-ORDINATED MILLET SCHEME—NEW SCHEME—I.C.A.R.

Botany Committee

The Botany Committee recommended the report of Dr. B. P. Pal, Chairman, Botany Committee on the establishment of Regional Research Station on Millet Crops for adoption.

SUBJECT NO. B-16

PULSE RESEARCH SCHEME, ASSAM

Eastern Regional Committee

"The Committee recommended the schemes provided the work was put in charge of a Class II Officer instead of one Botanical assistant so that the work could be properly supervised. The provision for T.A. was recommended to be reduced to Rs. 600 from Rs. 1,000 for the first year. The expenditure on non-recurring items like furniture, bullock-cart, one pair of bullocks and reclamation should be borne by the State Government".

Botany Committee

The Botany Committee took into account the fact that a scheme for work on pulses had been in operation in Assam previously for about five years. The present scheme had not been well drafted but in view of the fact that pulses were important in Assam, and adequate results have not yet been achieved, the Committee recommended that the I.C.A.R. should send an Expert to visit Assam to examine the results which were achieved under the former scheme and to help in drawing up a new scheme. The Committee did not recommend the scheme in its present form.

SUBJECT NO. B-17

SCHEME FOR THE IMPROVEMENT OF PULSES IN ANDHRA

Southern and Coastal Regional Committee

The Committee observed that the cultivation expenses were on the high side, and these should be reduced from Rs. 2,100 to Rs. 1,500 per year. The receipts accruing from the scheme should be shared on a 50:50 basis and not to be credit in full to the State Government as stated in the scheme. The technical control of the scheme should be with the Millet Specialist.

Botany Committee

The Botany Committee agreed with the Southern Regional Committee and recommended the scheme subject to the remarks made by that Committee. It was, however, considered that office contingencies were too high, and should be reduced to Rs. 600. The non-recurring expenditure should be met by the State Government. It recommended that the land be leased for the full period of the scheme so that the work is not shifted from one piece of land to another.

SUBJECT NO. B-18

SCHEME FOR THE IMPROVEMENT OF IMPORTANT INDIAN PULSES NUTRITIVE QUALITY AND NITROGEN FIXING CAPACITY AT COIMBATORE AND ADUTHURAI

Southern and Coastal Regional Committee

The Committee did not recommend the schemes in its present form, as in its view there was no need to study the nutritive values of pulses [protein content item (iii) of I]. The programme under II, *viz.*, Nodulation and Allied Subjects be revised to fit in with the scheme already sanctioned. If the revised scheme was sent by the State Government before October, 1956, it would be considered by the appropriate Scientific Committees.

Soil Science Committee

The Committee was informed that the Regional Committee has recommended the deletion of the chemical investigation and that the sponsors were asked to revise the scheme accordingly. As the revised scheme will be only a botanical scheme the Committee did not think it necessary to consider it.

Botany Committee

The Botany Committee noted that a scheme of 'Investigations' on cytogenentics and morphogenesis of nodules of some important leguminous crops has been proposed by the Calcutta University. The Committee did not recommend the present scheme.

SUBJECT NO. B-19

ITEM NO. 4—INVESTIGATION ON CYTOGENETICS AND MORPHOGENESIS OF NODULES OF SOME IMPORTANT LEGUMINOUS CROPS—WEST BENGAL (NEW SCHEME)

Eastern Regional Committee

The Committee recommended the scheme subject to the details of expenditure being scrutinised by the Scientific Committee.

Botany Committee

The Committee agreed with the Regional Committee and recommended the scheme subject to the following proviso: (i) The post of one mali to be deleted. (ii) the equipment to be provided if it is not already avaiable in the Presidency College.

SUBJECT NO. B-20

PHYSIOLOGY OF FLOWERING IN TROPICS—CALCUTTA UNIVERSITY, WEST BENGAL—EXTENSION

Eastern Regional Committee

The Committee recommended that the Scientific Committee should examine whether the results achieved so far justified the extension of this scheme.

Botany Committee

It was noted that the scheme has yielded some valuable information on distribution of auxins in different stages of growth at the shoot, apex and at different nodes. The Botany Committee recommended the extension of the Scheme in order to enable the work to be completed

SUBJECT NO. B-21

CO-ORDINATED SCHEME ON PADDY FOR BREEDING AND EVALUATION OF RICE STRAINS RESISTANT TO PIRICULARIA DISEASE IN ANDHRA AND SCHEME FOR WORK ON SPRING RICE IN FLOODED AREAS OF COLLAIR,—EXTENSION—ANDHRA STATE

Eastern Regional Committee

The scheme was recommended. The Scientific Committee should carefully examine the details of expenditure and reduce the cost of the scheme as far as possible. The Director, Central Rice Research Institute, Cuttack, may be requested to help the State Government in framing the programme of work.

Botany Committee

The scheme was recommended for sanction for a pediod of five years on a 50:50 basis, subject to the work being restricted to two centres, namely Nellore for blast resistance and Pulla for work on spring rice in flooded areas of Colliar. The staff recommended was one Assistant Paddy Specialist, one Scientific Assistant, one Pathological Assistant, and one Field man for the Nellore centre and one Scientific Assistant and one Fieldman for the Pulla centre. The pay and allowances of the clerk as also the non-recurring expenditure should be met by the State Government.

SUBJECT NO. B-22

STORAGE AND VIABILITY OF POLLON GRAINS AND PHYSIOLOGY OF POLLON TUBE GROWTH—EXTENSION—DELHI UNIVERSITY

Nothern and Temperate Regional Committee

The scheme was recommended for approval subject to scrutiny by the Scientific Committee.

Botany Committee

The scheme was recommended for sanction for a period of two years. Instead of the purchase of refrigerator it was suggested that the same may be rented and a sum of Rs. 250 per annum may be provided for this purpose.

SUBJECT NO. B-23

WHEAT RUST CONTROL—EXTENSION—U.P

Northern and Temporate Regional Committee

The committee recommended the scheme relating to breeding of wheat resistant to rust as mentioned in part (B) of the scheme, provided that staff and other expenditure was in conformity with the model scheme.

Botany Committee

The Botany Committee recommended the scheme subject to the proviso that the work under it will conform strictly to the Model Scheme drawn up for botanical portion of the Co-ordinated Wheat Rust Research Scheme.

SUBJECT NO. B-24

MULTIPLICATION AND DISTRIBUTION OF HYBRID BAJRA (CUMBU) SEEDS—EXTENSION—MADRAS

The Committee was of the view that the extension of this scheme should be considered by the Scientific Committee in the light of the co-ordinated scheme on millets being prepared by the Botany Committee. If the work proposed in the extension scheme was already included in the programme of the co-ordinated scheme, no further extension should be given.

Botany Committee

The Botany Committee recommended the extension of the scheme on the existing basis for a period of two years or until the Regional Station under the Co-ordinated Millet Scheme is established at Coimbatore, whichever is earlier.

SUBJECT NO. B-25

COORDINATED MAIZE BREEDING SCHEME—PROPOSAL FOR AMENDMENT—NOTE—I.C.A.R.

Botany Committee

The Botany Committee recommended the report for adoption.

SUBJECT NO. B-26

RICE BREEDING SCHEME—MADHYA PRADESH—ADDITIONAL STAFF

The Botany Committee recommended that the post of Assistant Botanist, Class II, should be provided, but the number of Research Assistants should be reduced from two to one. One peon may also be provided.

SUBJECT NO. B-27

COLLECTION AND MAINTENANCE OF MILLET VARIETIES AND TYPES GROWN IN INDIA—REPORT OF THE SUB-COMMITTEE

Botany Committee

The report of the Sub-Committee was recommended for adoption. The Botany Committee suggested that a Sub-committee consisting of Dr. T. R. Mehta, Shri V. M. Chavan, Shri B. W. Ponia and Dr. Z. H. Patel as members, may be set up to make recommendations for a standardised form of description of varieties on the lines previously adopted for certain crops.

SUBJECT NO. B-28

PROCEEDINGS OF THE WHEAT RESEARCH CONFERENCE AND CROP AND SOIL WING MEETING HELD IN SIMLA IN JUNE, 1956.

Botany Committee

The Botany Committee was informed by the Agricultural Commissioner that the note had been circulated only for the information of the members of the Botany Committee and that the recommendations made by the conference will be circulated by the I.C.A.R. to the State Departments of Agriculture for taking necessary action.

C.—AGRONOMY

SUBJECT NO. C-1

SURVEY AND IMPROVEMENT OF FODDER CROPS AT THE I.P.I., INDORE, NEW SCHEME—I.P.I., INDORE

Southern and Coastal Regional Committee

The Committee recommended that this scheme should be fitted into part II of the Co-ordinated Grassland Scheme already sanctioned by the I.C.A.R. and the Madhya Pradesh Government might be informed that it would be financed on a 50:50 basis. Item No. 3 of the programme may be excluded and the expenditure curtailed proportionately.

Agronomy Committee

It was noted that a centre for part II of Grassland Scheme has already been approved at Bhopal. As Bhopal is in the Malwa region, the Committee did not consider it necessary to have the centre at Indore also. Bhopal centre will serve the purpose for the whole region. The scheme was, therefore, not recommended.

Botany Committee

The Botany Committee agreed with the recommendations of the Agronomy Committee and did not recommend the sanction of the scheme.

SUBJECT NO. C-2

CYTOGENETICS OF THE WILD GRASSES AND BREEDING THEM FOR SELECTION OF FODDER AND FORAGE GRASSES—NEW SCHEME—MADRAS

Southern and Coastal Regional Committee

The Committee recommended the scheme and suggested that the work in this scheme should be integrated with the schemes at the I.V.R.I. and Dharwar.

Agronomy Committee

This is a Botanical Scheme and was referred to that Committee for their consideration.

Botany Committee

The Botany Committee recommended the scheme, but suggested that only the cytological part of the work should be carried out. The technical programme might be drawn up in consultation with Dr. Sikka, Head of the Division of Botany, Indian Agricultural Research Institute with a view to making a suitable allocation of the material. The work being done on wild relatives of sugarcane at the Sugarcane Breeding Institute, Coimbatore, should also be taken into account when framing the programme.

SUBJECT NO. C-4

SCHEME FOR THE STUDY OF EFFECT OF IMPORTANT AGRONOMICAL PRACTICES ON JOWAR AT THE INSTITUTE OF PLANT INDUSTRY, INDORE

Southern and Coastal Regional Committee

The Committee did not recommend it as a separate scheme because the work proposed had been included in the programme of work under the Model Agronomic Scheme in which a centre was already assigned to Madhya Bharat. The Madhya Bharat Government may, however, decide about changing the Ujjain centre to Indore.

Agronomy Committee

There is already a centre under the scheme of Model Agronomic Experiments at Ujjain, the programme of which includes studies on Jowar. It was recognised that this important Malwa tract for millets should be included in the studies in the co-ordinated scheme of the Regional Millet Stations on cotton oilseeds and millets in India. It was, therefore, suggested that the State Government may be requested to change the centre of Model Agronomic Experiments from Ujjain to Indore and further the Indore Centre may also be one of the sub-stations of the Regional Stations for work on millets as a part of the co-ordinated millet scheme. If the above suggestions are accepted, there will be no need for this separate scheme.

SUBJECT NO. C-8

WATER RELATIONS OF CROPS—WEST BENGAL

Eastern Regional Committee

In view of the fact that the research work envisaged in the scheme was being taken up in the Model Agronomic Exepriments scheme and the scheme in progress at Hazaribagh, the Committee did not recommend the scheme.

Agronomy Committee

In view of the fact that the work on water requirements of crops is being carried out as a part of the Model Agronomic Experiments Scheme and also some fundamental work is being done at the Indian Agricultural Research Institute and in the Indian Council of Agricultural Research scheme at Agricultural Meteorological Section, Poona, the Committee did not recommended the scheme.

SUBJECT NO. C-9

WATER REQUIREMENTS OF CROPS—NEW SCHEME—ANDHRA

Regional Committee

The Committee was informed that the work proposed to be carried out in this scheme had been provided for in the Model Agronomic Scheme under which 34 stations would be set up in the country, of which two stations would be located in Andhra. In the circumstances, the committee felt that a separate scheme from Andhra on the same subject was not necessary.

Agronomy Committee

The Andhra State has two centres of Model Agronomic Experiments, one of which is located in the Tungabhadra area. It includes most of the items of the programme in this scheme on the important crops of the region except sugarcane. The scheme was, therefore, not recommended by this Committee. The Committee, however, noted that the soil moisture-plant relationship studies proposed in the scheme were not a part of the programme of model Agronomic Experiments. The State Government may prepare a small scheme to study that problem for later consideration of the Council.

Regarding sugarcane, it was stated that there is a considerable body of knowledge from Padegaon and elsewhere, but if, however. the State Government so desires, they might apply to Central Sugarcane Committee for assistance for work on sugarcane.

SUBJECT NO. C-10

WATER REQUIREMENTS OF CROPS—NEW SCHEME—AGRI. COLLEGE

Regional Committee

The Agricultural Commissioner informed the Committee that the type of work proposed to be carried out in the scheme was being taken up in the Model Agronomic Exepriments scheme. In view of this, the Committee did not recommend the scheme.

Agronomy Committee

Same reasons as applied to item No. C-9 also apply to this scheme and the Committee, therefore, did not recommend it.

SUBJECT NO. C-11

GREEN MANURE—NEW SCHEME—UTTAR PRADESH

Regional Committee

The Committee recommended the scheme on the model of the co-ordinated scheme on Green Manuring Crops.

Agronomy Committee

The Committee recommended the scheme on the lines of the co-ordinated scheme on Green Manuring with the same staff and contingent expenditure as approved for the other centres of the Co-ordinated Scheme. The Committee also recommended that the State Agronomist may be associated with the operation of the scheme.

SUBJECT NO. C-12

NATURE AND EXTENT OF INTAKE OF DIFFERENT FORMS OF PHOSPHATES BY LEGUMINOUS GREEN MANURE CROPS —NEW SCHEME—MADRAS

Regional Committee

The Committee recommended the scheme on a 50:50 basis and suggested that a Microbiologist might be appointed in the scheme for elucidating the role of micro-organisms in the intake of phosphates.

The Agronomy Committee

The Committee recommended the scheme with the following modifications :—

(i) In analysing the plants, sulphur contents should also be estimated.

(ii) One of the Assistants proposed in the scheme should be Microbiological Assistant.

(iii) One Laboratory Assistant in grade 45-2-55 may be added to the staff proposed.

(iv) The State Government may be asked to provide the clerk for the scheme.

Subject to these, the scheme was recommended.

Soil Science Committee

The Committee recommended the scheme for sanction. It was felt that the emphasis should be on properly planned field studies in the different types of soils. There was a case for similar studies in other parts of the country.

SUBJECT NO. C-13

SPRINKLER IRRIGATION—NEW SCHEME—MADRAS

Regional Committee

The Committee recommended the scheme with the proviso that the Scientific Committe should ensure that the programme was in conformity with the Poona scheme (already sanctioned) so that the work in this scheme was done mainly from the agronomic point of view.

Agronomy Committee

In view of the fact that the I.C.A.R. have already sanctioned two schemes on Sprinkler Irrigation *viz.*, one at Poona and another in Coorg and also one scheme is proposed to be sanctioned for Himachal Pradesh or Punjab, it was not considered necessary at this stage to have any more centres of work on this problem till data become available from those schemes. The Committee, therefore, did not recommend this scheme.

SUBJECT NO. C-14

SPRINKLER IRRIGATION—NEW SCHEME—WEST BENGAL

Regional Committee

The Chairman informed the Committee that the I.C.A.R. had already decided to conduct trials of the possibilities of the sprinkler system of irrigation at the Indian Agricultural research Institute and at a suitable centre in the hills. In view of this, the Committee did not recommend this scheme.

Agronomy Committee

For the same reasons as those given under Item No. C-13, the scheme was not recommended.

SUBJECT NO. C-16

STUDY OF WEEDS OF CROP FIELDS OF EASTERN PART OF INDIA—NEW SCHEME—WEST BENGAL

Regional Committee

The Committee did not recommend the scheme on the grounds that the survey work of the type proposed therein should be undertaken by the State Government. A similar decision was taken in respect of a scheme received from Assam.

Agronomy Committee

The Committee felt that the work envisaged in this scheme should be undertaken by the Government as the part of their general programme of work. They, therefore did not recommended the scheme.

SUBJECT NO. C-17

WEED CONTROL—WEST BENGAL

Regional Committee

The Committee did not recommend this scheme in the present form, but was of the view that a scheme on the model of the co-ordinated scheme might be invited from the Agriculture Department, West Bengal, so that the weeds of field crops could be investigated.

Agronomy Committee

The Committee recommended that the work on weeds should form a part of the Co-ordinated Weed Control Scheme sanctioned by the I.C.A.R. and the scheme on that basis, if submitted through the Department of Agriculture, may be taken up for consideration. It was noted that though Weed Centre work is also being done at the Bose Institute, Calcutta, the work envisaged in that Centre is of a different type than in the Coordinated Weed Control Scheme.

SUBJECT NO. C-18

WEED CONTROL—I.P.I.

Regional Committee

The Committee did not recommend this scheme as similar schemes had already been sanctioned for Madhya Bharat, Madhya Pradesh and Bhopal.

Agronomy Committee

In view of the fact that similar schemes have already been sanctioned for Madhya Bharat, Madhya Pradesh, and Bhopal, there seems to be no need to have another centre at Indore. The Committee, therefore, did not recommend the scheme.

SUBJECT NO. C-19

HYDROPONIC EXPERIMENTS—NEW SCHEME—U.P.

Agronomy Committee

The scientific side of this work has already been fully worked out and the Committee felt that it was not necessary to do any further work on that aspect. There are, however, only limited possibilities for the practical application of this work and it was felt that Crop Physiologist of the U.P. Government may do this work as a part of his own programme.

It was also noted that the Government of Uttar Pradesh had asked for full contribution from the Council instead of usual 50:50.

The scheme was not recommended.

Soil Science Committee

The Committee remarked that a large amount of literature on the subject was already available and that much fresh information could not be obtained from the scheme under reference. The Committee did not therefore, recommend the scheme.

SUBJECT NO. C-25

PHENOLOGICAL OBSERVATION—EXTENSION—METEROLOGICAL DEPARTMENT

Regional Committee

The Committee recommended that the work already done in this scheme should be compiled and the Agronomy Committee should consider whether, on the basis of the work already done, this scheme should be continued further. In the opinion of the Regional Committee, the work proposed in this scheme did not appear to have much practical utility.

Agronomy Committee

The Committee recommended that the work already done under the scheme for the last 4½ years should be complied and it will then be time to consider whether this scheme should be continued from the funds of the I.C.A.R. The general consensus of opinion was that this type of work should form part of the programme of work of the Department. The Committee suggested that the scheme be also referred to the Botany Committee for their opinion.

Botany Committee

The Committee did not recommend the continuation of the scheme and it was suggested that the work so far done under the I.C.A.R. should be compiled at an early date.

SUBJECT NO. C-27

MANUFACTURE OF WEEDICIDES AT NATIONAL CHEMICAL LABORATORY—NOTE—I.C.A.R.

Agronomy Committee

In view of the earlier decision to use the weedicides available in the market in the Coordinated Weed Control Scheme, it was felt that it was no longer necessary to manufacture the weedicides at N.C.L. It was further noted that Trichloroacetic Acid which was indented by the Director, I.A.R.I. is also readily available in the market. On these grounds, the Committee did not recommend the continuation of this work at N.C.L.

Soil Science Committee

After considering the various aspects, the Committee recommended that the programme at the National Chemical Laboratory, may be discontinued.

SUBJECT NO. C-28

CULTURAL STUDIES OF AUS PADDY—WEST BENGAL—NEW SCHEME

Eastern Regional Committee

The Committee was of the view that the work envisaged in the scheme was already covered by the Model Agronomic Experiments Scheme and the D.V.C. research scheme. In view of this, the Committee suggested that the work should be carried out as part of the Model Agronomic Experiments scheme, under which two centres have been sanctioned for West Bengal. In case there was some variation in the programme of work, the same could be adjusted to fit the approved programme of the Model Agronomic Experiments Scheme.

Agronomy Committee

It was noted that the work on aus paddy was not included in the programme of Model Agronomic Experiments. The Committee, therefore, recommended the scheme with the modification in staff and expenditure as under :—

	1st year	2nd year	3rd year	Total
. *Pay of Establishment*—				
1. One Assistant Agronomist in the scale of Rs. 250—20—650—25—750.	3,000	3,240	3,480	9,720
2. One Overseer in the scale of Rs. 90—4—130.	1,080	1,128	1,176	3,384
3. Two Fieldmen in the scale of Rs. 55—1—68—2—100.	1,320	1,344	1,368	4,032
4. One Peon in the scale of Rs. 20—1/4—25	240	240	240	720
II. *Allowances and Honoraria*—				
1. Dearness and additional dearness allowance.	3,100	3,200	3,200	9,500
2. Leave Salary	500	530	560	1,590
3. Provident Fund contributions . .	350	360	370	1,080
4. Travelling Allowance . . .	3,000	3,000	3,000	9,000
III. *Contingencies*—				
1. Wages and Casual labour . .	2,000	2,000	2,000	6,000
2. Seeds and manures . . .	1,000	1,000	1,000	3,000
3. Gunny bags, cloth bags etc. . .	1,000	1,000	1,000	3,000
4. Stationery	100	100	100	300
5. Miscellaneous expenses . . .	400	400	400	1,200
	17,090	17,542	17,897	52,526 or 52,530
	I. C. A. R. Share at 500%			26,260

NOTE.—One Typist Clerk to be provided by the State Government.

The Scheme may be sanctioned on 50 : 50 basis of recurring expenditure while non-recurring expenditure may be met fully by the State Government.

D—Soil Scince

SUBJECT NO. D-1

USE OF CARBON IN SOIL RECLAMATION—NEW SCHEME—PUNJAB UNIVERSITY

Northern and Temperate Regional Committee

The Committee recommended the scheme for a period of two years subject to a detailed examination by the Scientific Committees.

Soil Science Committee

The Committee was of opinion that charcoal had definite scope as a soil conditioner. Several aspects such as the source of Charcoal, the mode of preparation, the elimination of the associated ash and the cost have to be taken into account. The scheme, as now presented, lacked details, so it was not clear as to how the study is intended to be carried out. The Committee felt that the study should be taken up as a fundamental investigation and limited only to laboratory studies. The scheme was recommended for sanction of funds.

SUBJECT NO. D-2

STANDARDISATION OF SURFACE AREAS AND PH VALUE OF SOILS—NEW SCHEME—PUNJAB UNIVERSITY

Northern and Eastern Regional Committee

The committee recommended the scheme subject to a detailed scrutiny by the Scientific Committee.

Soil Science Committee

The Committee agreed that the scheme deserved support as a fundamental investigation. It was noted, at the same time, that a closely similar study forms a part of the programme already in progress under Dr. A. N. Puri at Bombay. The Committee recommended that the new programme should be drawn up in consultation with Dr. A. N. Puri and that the two Laboratories should be closely in touch with each other in the execution of the programme. With this proviso, the scheme was approved.

SUBJECT NO. D-3

DEMINERALISATION OF WATER—NEW SCHEME—PUNJAB

Northern and Temperate Regional Committee

The Committee recommended the scheme subject to the scrutiny by the Scientific Committee.

Soil Science Committee

The Committee was of opinion that the scheme was rather sketchy and did not present even a short account of the literature and particularly the earlier Indian work on the subject. The treatments proposed were unsuitable for drinking water, so that part of the programme may be dropped. There was some scope for application to irrigation water on a small scale and trials may be carried out with this object. Attention was drawn to a closely similar work on the treatment of textile wastes where treatment by running over a bed of gypsum was found useful. With the above modification the scheme was recommended for sanction. In view of the revised object the committee recommended that the title of the scheme may be changed to 'On treatment of saline waters for irrigation purposes'.

SUBJECT NO. D-4

PHOSPHORUS AND POTASH FIXATION IN PUNJAB SOILS—NEW SCHEME—PUNJAB

Northern and Temperate Regional Committee

The Committee did not recommend this scheme but was of the view that the Scientific Committee should prepare a co-ordinated programme of research on this subject as the presence of potash or phosphorus in available from affects the uptake of Nitrogen. Professor Dastur, who has done considerable work on this subject should be invited to prepare a note and attend the meeting of the Scientific Committee which would consider his note.

Soil Science Committee

In addition to the scheme under reference, the Committee had also before it a report by Professor Dastur. Professor Dastur also attended the meeting by invitation and explained the need for an All-India programme in which the analysis will be linked with plant analysis. The soil analysis alone will not reveal fully requirements of any fertilising ingredient in relation to the others. The responses may vary with different plants rotations and also in different seasons. A thorough study of the subject will lead to fruitful results.

In the course of the discussion, it was pointed out that certain cations like calcium and magnesium may have an influence on the utilisation of potash. At the present time, there are manuring and cropping trials under various auspices. These are, for instance, the Model Agronomic Experiments and Simple Manurial Trials in farmer's fields. There were also different programmes under the Cotton Committee, the Oilseeds Committee and the Indian Council of Agricultural Research. There was need to co-ordinate the various programmes and in this the Soil Science and the Agronomy Committee should work together. There should be a joint sub-committee or Co-ordinate Committee that would draw up a comprehensive model scheme that could be initiated in different States in the country.

It was agreed that the list of representatives of Soil Science on the Joint Sub-Committee may be prepared by the I.C.A.R. in consultation with the Chairman. The Joint-Sub-Committee should meet as soon as possible and draw up the model plan. Based on this, the Punjab scheme may be modified and initiated as soon as possible. Other states may also be invited to send similar programmes.

SUBJECT NO. D-5

FERTILITY INDEX AND PREDICTION OF CROP PRODUCTION—NEW SCHEME—DR. A. N. PURI (BOMBAY)

Southern and Coastal Regional Committee

The Committee observed that this was a costly scheme and the work was proposed to be done in a private Laboratory without any guarantee of continuity. Since schemes of this nature were not given any financial assistance in the past by the I.C.A.R., the committee did not recommend this scheme.

Soil Science Committee

The Committee was of opinion that the Scheme is very ambitious and would normally require the facilities of a major research Institute and varied types of technical assistance. The Committee, therefore, felt that the programme should be restricted to certain aspects which would elucidate the feasibility of the technique proposed by Dr. A. N. Puri. On the basis of the preliminary study, which should also be repeated at the I.A.R.I., further extension to other aspects may be considered.

The Committee appointed a sub-committee consisting of Dr. J. K. Basu, Dr. Raychoudhery and Dr. A. N. Puri to go into the question and to make specific recommendation. The revised scheme as prepared by the Sub-committee, together with the related budget, is attached herewith.

The Committee recommended the revised scheme for approval. The Committee also recommended that a similar grant, covering only the recurring expenditure, may be made to the I.A.R.I. to conduct parallel studies as already recommended.

SUBJECT NO. D-6

INVESTIGATION OF KHAR LANDS—NEW SCHEME—BOMBAY

Southern and Coastal Regional Committee

The Committee recommended that items (a) and (b) of the Technical Programme might be omitted for the time being and the work restricted to other items. The Committee further recommended that this scheme should have a main station at Gujarat and Sub-Stations—one in the Ratnagari district and the other in North Alibagh. The staff at the main station should consist of one Class II Officer, one Agricultural Officer, two Agricultural Assistants, two Laboratory Boys, one peon and one Junior clerk. The staff at each of the two sub-stations should consist of one Agricultural Officer and one Agricultural Assistant. The experiment area of the main station should consist of 15 acres and that of each of the two sub-stations 10 acres. The T.A. should be reduced to Rs. 750 per year.

The following charges were proposed under contingencies:—

1. O.E.M. Rs. 600 per year.
2. Labour, daily and monthly water charges, seeds, manures, chemicals, etc.—Rs. 5,000 per year.
3. Purchase of and repairs to and upkeep of Live-stock and deadstock—Rs. 200 per year.
4. Construction of and repairs to buildings, fencing—Nil.
5. Daily allowance—Nil.
6. The total contingent expenditure recommended was Rs. 5,000 per year.

The Committee also did not recommend the expenditure of Rs. 13,541 proposed to be incurred during the current financial year as the scheme, if sanctioned, would start from 1st April, 1957. The respresentative of the State Government was asked to prepare a revised scheme on the lines suggested by the Committee. The revised scheme should reach the I.C.A.R. before the Scientific Committees met in October, 1956.

Soil Science Committee

The Committee agreed that the subject is a very important one and deserves study. As Bombay would be bigger State with a longer coast line after 1st November, 1956, it was felt that there was a case for at least three sub-stations together with the Central Station. There was also need for systematic survey of the areas involved.

The programme as proposed was considered as rather too elaborate. The Committee was of opinion that item (d) relating to the various concentrations of Salt on the yield of crops may be deleted.

The Committee felt, at the same time, that the problem is of importance to all the States whether inland or lowering on sea, but where salinity of the type or another is a problem, there should be planned programmes of study in as many states as possible. With this in view, the Committee recommended that there should be a standing committee for soil reclamation consisting of the following members :—

1. Dr. J. K. Basu. Convener
2. Dr. A. N. Puri
3. Dr. S. K. Mukherji.
4. Dr. Shah.
5. Dr. Maria Kelandai.
6. Dr. Krishna Rao.
7. The Soil Physicist of Bombay.
8. The Agricultural Chemist, Uttar Pradesh (Dr. Aggarwal).
9. Dr. Nijahwan.
10. Dr. H. L. Uppal.

The Sub-Committee should meet as soon as possible and draw up model programmes that could be adopted in different States.

While approving of the Bombay scheme in principle, the Committee recommended that the initiation of the scheme should be considered only in the light of the recommendation of the standing Committee.

SUBJECT NO. D-7

CHEMICAL TISSUE TESTS AND LEAF ANALYSIS—NEW SCHEME—ANDHRA

Southern and Coastal Regional Committee

The scheme was not considered as no papers were available.

Soil Science Committee

The Committee did not have before it the detailed scheme bearing on the subject. The State Government had not also agreed to meet half the cost of the scheme. The Committee felt, however, that the subject is one of some fundamental significance and may lead to some useful applications. There was justification for a Coordinated Study in which different states can participate.

With this in view, the Committee appointed a Sub-Committee consisting of:—

1. Dr. S. P. Raychoudhury, Convener.
2. Dr. Nijhawan
3. Dr. Krishna Rao

to draw up a model scheme which could be sent out to different States. The Andhra scheme can also fit into this pattern. The Sub-Committee should meet as soon as possible and prepare the model scheme.

The Committee felt, however, that Dr. Rao, the author of the scheme may be given some assistance to do some work in the lines to all the initiation of the showed scheme which may take some time. The Committee recommended that the Indian Council of Agricultural Research may award a Research Fellowship for work under Dr. Rao on the subject.

SUBJECT NO. D-8

THE NATURE AND EXTENT OF INTAKE OF DIFFERENT FORMS OF PHOSPHATES BY LEGUMINOUS GREEN MANURE CROPS AND THEIR AVAILABILITY TO PADDY—FROM MADRAS

Soil Science Committee

The Committee recommended the scheme for sanction. It was felt that the emphasis should be on properly planned field studies in the different types of soils. There was a case for similar studies in other parts of the country.

SUBJECT NO. D-9

MICRO-NUTRIENTS ELEMENT IN THE PHYSIOLOGY OF CROP PLANT WITH THE HELP OF RADIO-ACTIVE TRACERS—WEST BENGAL (NEW SCHEME)

Eastern Regional Committee

The committee recommended the scheme and suggested that the work under the Scheme should be co-ordinated with the work in progress at I.A.R.I. The Scientific Committee should examine whether the expenditure on apparatus and equipment was justified.

Soil Science Committee

The Committee was of opinion that the scheme deserved support. As the Indian Agricultural Research Institute is also engaged on a closely similar programme, there was need to prepare the technical programme in consultation with the Indian Agricultural Research Institute. The scheme was recommended for sanction.

SUBJECT NO. D-10

SURVEY OF ANTIBIOTIC PRODUCING MICRO-ORGANISM FROM THE SOILS IN INDIA—WEST BENGAL—BOSE INSTITUTE

Eastern Regional Committee

The Committee was of the view that the scheme did not fall within the purview of the Indian Council of Agricultural Research. The scheme might be commended to the Council of Scientific and Industrial Research.

Soil Science Committee

The Committee was of the opinion that the scheme would come more appropriately under the purview of the Council of Scientific and Industrial Research or the Indian Council of Medical Research and did not, therefore, recommend it.

SUBJECT NO. D-11

RECLAMATION OF SALINE SOIL—WEST BENGAL

Eastern Regional Committee

The Committee recommended the scheme subject to the proviso that the Scientific Committee would scrutinise the expenditure in the light of the Scheme already sanctioned by the I.C.A.R.

Soil Science Committee

The Committee decided that this scheme should be referred to the Standing Committee appointed for the subject. After the model plan is drawn up, the scheme, with the necessary modifications, may be initiated in West Bengal.

SUBJECT NO. D-12

SOIL PLANTS INTER-RELATIONSHIP WITH RESPECT TO UPTAKE OF MINOR ELEMENTS—WEST BENGAL—NEW SCHEME

Eastern Regional Committee

In view of the fact that the work envisaged in the scheme was already being done at the Indian Agricultural Research Institute and in the Bose Research Institute, the Committee did not recommend the scheme.

Soil Science Committee

The Committee was of the opinion that as a major scheme on the subject was already in progress at Indian Agricultural Research Institute and also at the Bose Institute there was no necessity for the proposed scheme. The scheme was not recommended.

SUBJECT NO. D-13

BIOLOGICAL APPROACH FOR THE RECLAMATION OF SOILS —MADRAS

Soil Science Committee

While recognizing the need for the study, the Committee was of opinion that it should form a part of the Coordinated programme for which a Sub-Committee had already been appointed.

SUBJECT NO. D-14

FOLIAR APPLICATION OF NUTRIENTS TO CROPS—NEW SCHEME—I.A.R.I.

Northern and Temperate Regional Committee

In view of the fact that foliar application of nutrients was practised on a field scale in some countries, the Committee was of the view that a modest scheme for a period of three years should be prepared and carried out at one centre at New Delhi. The scheme should work out methods of application to suit local conditions. The revised scheme should be scrutinised by the Soil Science and Agronomy Committees.

Soil Science Committee

The Committee discussed the subject with Dr. N. B. Das who was present by invitation. The Committee was of opinion that the programme may yield useful results in respect of fruit trees and certain other important economic crops but may not be of much practical value in respect of field crops. It was also felt that the budgetary provisions as now made were excessive and should be drastically cut down. There was no necessity for additional superior staff when the staff of the Institute were themselves available to provide the guidance.

A revised scheme was prepared by a Sub-Committee appointed for the purpose in the light of the above discussions. The revised scheme was then approved by the Committee.

SUBJECT NO. D-15

SCHEME FOR SOIL STRUCTURE—NEW SCHEME—PUNJAB

Northern and Temperate Regional Committee

The Committee did not recommend the scheme.

Soil Science Committee

The Committee was of opinion that the study of soil structure as influenced by its make up, reaction and crop was important. Such studies should be carried out not only in the Punjab, but also in other parts of the country. There should be an integrated programme for which a modal plan should be drawn up.

The Committee appointed a Sub-Committee consisting of—

1. Dr. Daji, Convener.
2. Dr. J. K. Basu.
3. Dr. Nijhawan.

to draw up such a plan in relation to specific crops. On the basis of such a plan, the Punjab scheme may be initiated. Other States may also be invited to send similar plans.

SUBJECT NO. D-16

STUDY OF ORGANIC MATTER OF MAJOR SOIL TYPES WITH REFERENCE TO CLAY HUMUS COMPLEXES AND CHALATE COMPOUNDS—NEW SCHEME—B. H. UNIVERSITY

Eastern Regional Committee

The Committee did not recommend the scheme as it was considered to be very costly and also there was no indication that necessary facilities for carrying out the work existed at the Banaras Hindu University. It was also not known whether the University had conducted any studies in this type of work. The Scientific Committee may, therefore, examine if the scheme should be sanctioned at the Banaras Hindu University.

Soil Science Committee

The Committee was of opinion that the scheme as submitted. is not likely to yield results of practical value and did not therefore recommend it.

SUBJECT NO. D-17

RESEARCH ON MICRO AND MICRO-NUTRIENT ELEMENTS STUDIES IN USAR LANDS—NEW SCHEME—LUCKNOW UNIVERSITY

Eastern Regional Committee

The Committee was of the view that there was no justification for duplicating this work which was already being done at the Indian Agricultural Research Institute. In view of this, the scheme was not recommended.

Soil Science Committee

The Committee noted with regret that the scheme had not been drawn up in the manner that had been suggested by the Indian Council of Agricultural Research. It would have been useful if the modified scheme had been drawn up in consultation with Dr. Raychowdhry and Asana of the Indian Agricultural Research Institute. The Committee did not recommended the scheme as now submitted for sanction.

SUBJECT NO. D-18

NITROGEN FIXATION OF LEGUMINOUS CROPS—MADRAS

Soil Science Committee

The Scheme was recommended for sanction.

SUBJECT NO. D-19

CHEMICAL INVESTIGATIONS OF THE CAUSE OF BLAST RESISTANCE IN PADDY—NEW SCHEME—MADRAS

Eastern Regional Committee

The Committee was of the view that an effective remedy against blast disease was to breed varieties resistant to this disease. In view of this, the investigation proposed in the scheme was not favoured.

Soil Science Committee

The Committee remarked that the incidence of the disease could not be dissociated from the use of nitrogeneous fertilizers at high levels. Apart from studies on the intake of silicon in some easily assimilable forms, the stability of the added compounds in the soil also deserved to be followed up. With these modifications the Committee recommended the scheme for sanction.

SUBJECT NO. D-25

STUDY OF THE RATE OF DECOMPOSITION OF INSECTICIDAL DEPOSIT AT THE OSMANIA UNIVERSITY, HYDERABAD—DECCAN

The Committee remarked that the subject of proposed study was important and deserved support. The Committee recommended the scheme for sanction.

SUBJECT NO. D-25(b)

SCHEME ON STUDY OF NUTRITIVE VALUE, PROTEIN AND THIAMINE CONTENT OF DIFFERENT VARIETIES OF WHEAT AND STUDY OF PHYSIOLOGICAL CONDITIONS WHICH CAN IMPROVE THE QUALITY WITH REFERENCE TO THESE CONSTITUTENTS—M.G.M. COLLEGE INDORE

Northern and Temperate Regional Committee

The Committee did not recommend the scheme as similar work was already in progress at the I.A.R.I. However, the Botany Committee might examine if the work proposed in the scheme should be taken up. In case it was to be taken up, the provision for clerks and the peon should be deleted from the proposal.

Botany Committee

The Botany Committee did not recommend the scheme, because, as pointed out by the Regional Committee, work was already in progress at I.A.R.I. Also, it was obvious that this kind of work would be carried out in association with the centre where a large collection of wheat varieties was being maintained and where other aspects of the work are being carried out.

Soil Science Committee

The Committee remarked that in addition to the work done in different parts of the world, a similar programme of work has already been in progress at the I.A.R.I. Studies on vitamin contents are being carried out under the auspices of the I.C.M.R. As it was felt that the proposed scheme is not likely to provide much fresh information, the Committee did not recommend the scheme for sanction.

SUBJECT NO. D-25(c)

A SCHEME FOR INVESTIGATION ON THE NUTRITIVE VALUE OF COMMON AND HYBRID INDIAN WHEATS—I.A.R.I.

Social Science Committee

The Committee noted that the scheme had already been financed by the I.C.A.R. for some years. While recognizing the need for continuing such work, the Committee felt that the work should now form a part of the normal progress of the I.A.R.I. The Committee did not therefore, recommend the permission of funds for the scheme.

SUBJECT NO. D-25(d)

SCHEME FOR THE SALINITY AND ALKALINITY CONTROL IN THE PUNJAB IRRIGATION AND POWER RESEARCH INSTITUTE, AMRITSAR

Soil Science Committee

While recognizing the need for such a study, the Committee felt that there should be an integrated programme for the study and reclamation of all types of saline and alkaline soils in India. As the Committee had already appointed a Standing Committee (under D6) to go into the whole subject, it was considered appropriate that the same Committee should consider all the schemes. The Committee desired that the Standing Committee should meet at a very early date and draw up model programmes that could be adopted in different States that had already applied for assistance. The Indian Council of Agricultural Research may also contact other States that have similar problems. The Committee expressed the hope that the model schemes may be initiated in as many regions as possible.

SUBJECT NO. D-26

HUMIFICATION OF ORGANIC MATTER EXTENSION—AGRA AGRICULTURAL COLLEGE

Northern and Temparate Regional Committee

The Committee reiterated the decision taken last year that the results already achieved should be given a field trial by the State Agricultural Department. However, extension for one year was recommended as a special case so that the work already done should be written up.

Soil Science Committee

The Committee agreed to the extension of the scheme by only one year to complete the work on hand and to write up the report.

The Committee recommended the sanction of Rs. 1,290 towards the field work as proposed.

SUBJECT NO. D-27

SOIL ANALYSIS—STANDARDISATION—EXTENSION—DR. A. N. PURI (BOMBAY)

Southern and Coastal Regional Committees

The Committee was informed that this scheme was originally sanctioned for three years and had run only for about 1½ years by this time. In the opinion of the Committee, the work could be finished in three years from the date of start of the scheme and no extension would be necessary as proposed by the State Government.

Soil Science Committee

The Committee noted that only a limited amount of progress had been made because of the late start of the scheme and that a great deal of further work still remained to be done. It was felt at the same time that the methods, as standardised, should be circularised as quickly as possible and arrangements made for independent trials by State Agricultural Chemists and others. The Committee, also suggested that the latest developments in the field of soil analysis should be watched and any new methods proposed should be checked up in addition to the known ones. For this purpose, the Committee suggested that there should be a Sub-Committee consisting of :—

(i) Dr. A. N. Puri, Convener.
(ii) Dr. S. P. Raychowdhury.
(iii) Dr. J. K. Basu.
(iv) Dr. S. D. Nijhawan.

which should keep in close touch with the progress of the scheme and make necessary suggestions from time to time. With this proviso, the Committee recommended the scheme for sanction.

SUBJECT NO. D-28

AMMONIUM SULPHATE TO PADDY LANDS—WEST BENGAL (EXTENSION)

Eastern Regional Committee

The Committee recommended that extension to this scheme may be given for one year as a special case so that the soil samples already taken could be analysed, but indicated that no further items of work should be taken up. The work done in the scheme should be written during the period of extension.

Soil Science Committee

The Committee felt that the scheme had been maintained sufficiently long by the Indian Council of Agricultural Research and that it is now time for the State Government to take over the work. It was considered desirable that the experimental areas should be maintained as permanent manurial plots. With this object, it was recommended that a grant of Rs. 2,000 per annum may be made by the Indian Council of Agricultural Research for a limited period towards the contingent expenditure connected with the maintenance of the plots.

SUBJECT NO. D-29

MICRO-NUTRIENT STATUS OF BOMBAY SOILS—BOMBAY

Soil Science Committee

The Committee noted that the scheme has been started rather late and that it will take one more year than was first anticipated. The Committee recommended the extension of the scheme for the period proposed.

SUBJECT NO. D-30

BIOLOGICAL NITROGEN—FIXATION UNDER DIFFERENT INDIAN CONDITIONS WITH PARTICULAR REFERENCE TO ITS IMPORTANCE IN PRACTICAL AGRICULTURE—NOTE BY DR. M. R. MADHOK, PUNJAB

Dr. M. R. Madhok was present by invitation and explained the objects of his note. The Committee agreed that the programme which he had indicated would yield valuable data. It was felt that the role of legumes in strip cropping and in erosion control should also be included in the study. There was a need for a comprehensive programme which could be initiated in different parts of the country. With this in view, the Committee suggested the appointment of a Sub-Committee consisting of the following members:—

1. Dr. M. R. Madhok, Convener.
2. Dr. P. K. De.
3. Dr. S. P. Raychowdhry.
4. Dr. N. Narayana.
5. Dr. J. V. Bhat.
6. Dr. B. N. Singh (Assistant Director, Central Drug Research Institute, Lucknow).

The Sub-Committee may meet as soon as possible and prepare concrete plans and programme of work for further action.

E–FLORICULTURE

SUBJECT NO. E-1

SCHEME FOR CYTOGENETICAL AND PHYSIOLOGICAL STUDIES IN RELATION TO FLORICULTURE, I.A.R.I.

Floriculture Committee

Dr. Pal briefly explained the details of the scheme. Dr. Patel suggested that work on scented Indian flowers should also be included in the programme. The Chairman supported the proposal.

Dr. Uppal enquired whether the scheme will be taken up in the Division of Botany or the Division of Horticulture, which was being set up at the I.A.R.I. Dr. Pal explained that the work related to both the Divisions and would have therefore to be carried out in close cooperation between the two Divisions.

Shri Suri, Deputy Financial Adviser suggested that the possibility of reduction of staff might be considered. Dr. Pal replied that if all the items of work included in the programme were to be taken up, it would not be possible to reduce the staff.

The Committee recommended the scheme for sanction subject to the modification that work on Indian scented flowers should also be taken up.

SUBJECT NO. E-2

CULTIVATION OF LOTUS—U.P.

Floriculture Committee

The Chairman remarked that the title of the scheme indicated that work was to be taken up on lotus alone while the programme of the scheme included work on water lilies also. He suggested that the title of the scheme should be enlarged to include lilies.

Shri Bhagwat suggested that the material available in different parts of the country should be collected. The Chairman requested all members of the Floriculture Committee to send as much material as possible to enable selection of suitable varieties being made. He said that good varieties of red lotus should also be collected for propagation.

Shri Bhagwat suggested that, as far as possible voluntary labour should be secured for the construction of lotus tanks. The Chairman remarked that this was likely to result in delay in the execution of the scheme but the suggestion might be kept in mind and voluntary labour utilised if and when it became available.

As regards staff it was decided that the Head Chowdhury and Chowkidar were not necessary. It was also felt that the provision under "T.A." was insufficient. It was, therefore, decided that the savings effected by the retrenchment of the posts of Head Chowdhury and Chowkidar should be added to the provision made under "T.A.".

The Committee recommended the scheme for sanction subject to the modifications mentioned above and with the further proviso that the staff should be actually engaged only when the tanks were ready for further work.

SUBJECT NO. E-3

SCHEME FOR THE MULTIPLICATION OF ANNUAL FLOWER SEEDS IN THE U.P.

Floriculture Committee

Shri Percy Lancaster said that private gardeners and producers were already engaged in the multiplication and distribution of quality seeds and that if this work was also taken up by Government, it would involve a lot of duplication.

Mrs. Sawhney remarked that there was no dearth of private enterprise in this field.

The Chairman suggested that Government might confine its activities to the importation of new varieties of seed and pass them on for multiplication to private nurserymen after testing their quality and suitability

Dr. Pal supported this suggestion.

Shri S. M. Rao suggested that multiplication of seed be done on zonal basis in different coastal and interior regions.

Dr. Pal remarked that the whole question of seed production and multiplication should be considered on an All-India basis.

Shri Percy Lancaster pointed out that the scheme envisaged multiplication of seed on 5 acres land and that it would be difficult to dispose of the huge quantities of seed thus produced without adequate marketing arrangements. The Chairman said that the scheme should be revised in the light of discussions detailed above.

The Committee did not recommend the scheme in its present form.

SUBJECT NO. E-4

SCHEME ON THE RESEARCH AND DEVELOPMENT OF FLORICULTURE IN P.E.P.S.U./PUNJAB

Floriculture Committee

Shri S. M. Rao pointed out that in the case of Moghul Gardens at Pinjore it would not be possible to utilise the front portion and that the space on the sides in the interior would alone be available for the work of the scheme. He suggested that the scheme should be conducted in consultation with the Director General of Archaeology. The Chairman said that work on 'Gloxinia' and 'Tabebuias' should also be included in the programme of the scheme.

The Committee recommended the scheme for sanction subject to the above modifications.

F.—FRUITS

SUBJECT NO. E-1

RESEARCH ON CASHEWNUT—WEST BENGAL—NEW SCHEME

The Eastern Regional Committee recommended the scheme on the model of the schemes already sanctioned in Madras and Bombay on a 50:50 basis. The State Government would therefore carry out the programme of work on the lines of the model scheme.

Horticulture Committee

The Committee felt that there was no necessity for having a peon under this scheme nor was there any need to undertake a detailed survey of cashew growing areas outside West Bengal. Accordingly it recommended that the T.A. provision should be reduced to Rs. 500 per annum from the second year of the scheme. Although the area is not specific in the scheme nor its location, the Officer who sponsored the scheme stated that it was proposed to devote ten acres for work and the venue would be in Midnapur district on laterite soil and on level ground. Under these conditions it was felt that there was scope for the reduction of cultivation expenses. The Committee, accordingly, suggested that the cultivation charges should be reduced from Rs. 2,500 to Rs. 2,000 per annum from the second year onwards. The estimated amount for purchase of furniture and equipments could be reduced to Rs. 1,000, to be incurred in the first year by the State Government. Subject to these comments the Committee recommend the Scheme.

SUBJECT NO. F-2

BANANA RESEARCH STATION—NEW SCHEME—ANDHRA

The Southern Regional Committee recommended the scheme on the clear understanding that it would form part of the Banana Research Scheme. The technical programme should be restricted to items 3, 5 and 6. The staff should be reduced to one Assistant, one Fieldman and one peon against two Assistants, two Fieldmen and two peons respectively, provided in the scheme. The area should be reduced to 15 acres. Under contingencies, the amounts on account of lease of land and rent of building should be borne by the State Government. The cultivation charges should be reduced to Rs. 8,250 as against Rs. 12,500 per year, and the expenditure on stationery, service stamps, etc., from Rs. 1,200 to Rs. 500. The item of unforseen expenses should be deleted. Thus the total contingencies for three years recommended by the Committee should be Rs. 26,250 as against Rs. 66,000 proposed by the State Government. It was also observed that the receipts at the rate of Rs. 800 per acre were on the low side. It should be at least Rs. 1,000 per acre or Rs. 15,000 per year. The Committee recommended that the net expenditure after alloting for the receipts should be shared on a 50:50 basis.

Horticulture Committee

The Committee endorsed the recommendations of the Southern and Coastal Regional Committee in regard to the restriction of work to only items 3, 5 and 6 of the technical programme and the reduction of the staff to one Assistant, one Fieldman, and one Peon and the area to 15 acres only. The Committee also agreed with the above-mentioned Committees on the need to reduce the cultivation charges to Rs. 8,250 from Rs. 12,500 per year, from Rs. 1,200 to Rs. 500 for the purchase of stationery and service stamps, and the total contingencies from Rs. 66,000 to Rs. 22,250. The deletion of the item 'unforeseen expenses', was also recommended. Subject to these comments, the Committee recommended the scheme for acceptance.

SUBJECT NO. F-3

CYTOGENTIC STUDIES ON GRAPES AND WILD SPECIES

Horticulture Committee

The Committee recommended the scheme and suggested that the State Government should meet the entire recurring cost including the purchase of microscope etc.

SUBJECT NO. F-5

IMPROVEMENT OF PINE-APPLE BY APPLICATION OF GROWTH REGULATING SUBSTANCES, GAUHATI UNIVERSITY

Horticulture Committee

The Committee approved the revised scheme on condition that the detailed technical programme is formulated along with that of the Co-ordinated Scheme, if possible, in consultation with the Foreign Expert who is yet to arrive in the country.

SUBJECT NO. F-6

INVESTIGATION OF ROOT-ROT AND LIMB BREAKAGE IN CITRUS—NEW SCHEME—ANDHRA

The Southern Regional Committee

Recommended the Scheme.

The Plant Diseases Committee

The Committee recommended the scheme but it was suggested that only one attendant should be provided and no peon. The Committee also recommended for sanction T.A. at the rate of Rs. 500 per annum and Contingencies at the rate of Rs. 2,000.

Horticulture Committee

The Committee suggested that the work should be restricted only to Dry Root, since the deficiency diseases already form part of a Co-ordinated Die-Back Scheme. It was further suggested that the centre of work should be at Kodur where plant material in the existing Fruit Research Station as well as the large number of neighbouring orchards would be available for study. The staff consisting of one Assistant Mycologist, one Horticultural Assistant, one Attendant and one Peon was recommended. The post of fieldman was not considered necessary. The Committee strongly felt that the Technical Programme should be revised in order to devote emphasis on the study of soil conditions in relation to Dry Root Rot incidence. This would involve a study of the actual growing conditions not only in Kodur but also in all such important citrus producing centres.

SUBJECT NO. F-7

TRAINING IN FRUIT PRESERVATION—NEW SCHEME—ANDHRA

The scheme was not put up for the consideration of the Southern Regional Committee. If the scheme was drawn up on the lines of the model scheme, the Committee would have recommended that financial assistance to the extent of Rs. 2,000 per year might be given to the State Government for undertaking peripatetic courses in fruit preservation, each lasting over a period of two weeks.

The Horticulture Committee

The scheme was approved on condition that the grant is limited to Rs. 2,000 per annum, for a period of three years.

SUBJECT NO. F-9

ESTABLISHMENT OF NATIONAL COLLECTION OF BANANA VARIETIES AT THE BANANA RESEARCH STATION—NEW SCHEME—MADRAS

The Southern Regional Committee had no objection to this work being carried out, but recommended that the work proposed in this scheme was already being done under the Banana Research Scheme and should be intensified. In case some more items of work were proposed to be studied, the same should be taken up in the scheme already functioning in Madras.

The Horticulture Committee

The Committee recommended that the existing collection of banana varieties should be maintained and augmented to the extent possible with the funds already sanctioned for the Central Banana Research Station. It was also suggested that the plant introduction centre in South India should co-ordinate the work on plant collection such as those at this Central Banana Station.

SUBJECT NO. F-10

SCHEME FOR INVESTIGATION IN THE METHODS OF CONTROLLING FRUIT DISEASES—NEW SCHEME—AURANGABAD

The Southern Regional Committee observed that the diseases listed in the scheme have already been taken care of in the I.C.A.R. schemes. The State Government may, therefore, be asked to furnish details before October, 1956, to enable the Scientific Committee to examine their scheme carefully.

Plant Diseases Committee

The Committee felt that as far as Banana wilt of banana is concerned Basrai variety is said to be resistant and may be tried in the affected area. Scap of grape has been observed to be due to mechanical injury and sun scald, and it was felt that isolations may be made in the first instance to study whether any micro-organism was involved. As far as Bunchy Top of banana is concerned, the material may be sent to the Virus Research station of the I.A.R.I. for checking up as to whether the disease was Bunchy Top or mosaic. The Committee did not recommend the scheme for sanction.

Horticulture Committee

The Committee endorsed the recommendations of the Plant Diseases Committee that the work on trace elements or deficiency discases need not be taken up in this State in view of the co-ordinated scheme already functioning under the control of the Indian Agricultural Research Institute. Regarding banana diseases, the Committee recommended that the views of the virus workers at the I.A.R.I. should be obtained as to the correct diagnosis of the so-called bunchy top. In so far as the Panama Wilt disease is concerned, it was suggested that the testing of the several clones of Basrai was necessary before proceeding with the selection of further mutants. If any further work was necessary on other banana diseases, a separate scheme should be formulated for consideration of the I.C.A.R.

SUBJECT NO. F-11

INVESTIGATION INTO ENZYIMIC PROCESS INVOLVED IN THE GERMINATION OF MANGO SEEDS, NEW SCHEME—LUCKNOW UNIVERSITY

The Eastern Regional Committee recommended the scheme subject to detailed scrutiny by the Scientific Committee.

Botany Committee

The Botany Committee agreed generally with the remarks of the Horticulture Committee. It recommended the scheme but suggested that, besides mango, work should also be undertaken on cashewnut and tamarind seeds. The author of the scheme may be requested to redraft the Scheme in consultation with Dr. N. B. Das, Biochemist, Indian Agricultural Research Institute after obtaining information from different laboratories engaged in work on fruits and seeds.

Horticulture Committee

The Committee suggested that this scheme required to be reconsidered by the authors in view of the fact that mango seeds do not have any dormant period. This being a piece of fundamental research it would be desirable to enlarge the scope of the investigations to include seeds of other commercially grown fruits like citrus. The Committee understood that some work on allied aspects had been done already at the Indian Veterinary Research Institute, and that the All-India Fruit Technological Research Institute, Mysore may also be interested in problems of this kind. It, therefore recommeneded that the author should formulate a revised scheme in consultation with Dr. Roy Chaudhary, Dr. L. B. Singh and Dr. L. B. Das.

SUBJECT NO. F-12

SCHEME FOR ASSESSING VARIABILITY IN HORTICULTURAL MATERIAL WITH A VIEW TO REDUCE THE SAME —COORG

Plant Diseases Committee.

The Committee did not think it necessary to assess the variability in seed-propagated citrus like mandarin orange, nor was there any need to devise a method of restricting the variability in view of the well-known methods already known. The Committee, therefore, did not find it possible to recommend this scheme.

Horticulture Committee

The Committee endorsed the recommendations of the Plant Diseases Committee and suggested that the scheme might be sanctioned deleting the posts of Research Assistant and Peon. It further suggested that the cost on the purchase of furniture and on the post of a clerk should be met by the State Government.

SUBJECT NO. F-14

RESEARCH ON CITRUS FRUITS—WEST BENGAL—NEW SCHEME

The Eastern Regional Committee noted that this scheme was also not prepared properly and suffered from the same defects as the Pine-apple research scheme (Item No. 17). The State Government may, therefore, be requested to instruct their representative on the Scientific Committee to furnish details when this scheme was considered by the Scientific Committee. Subject to these remarks the scheme was recommended.

Horticulture Committee

In the course of the discussion it was brought out that decline is one of the major factors to be reckoned with in the production of mandarins both in Darjeeling and in Assam. Before a scheme of research is formulated to deal with this, the Committee recommended that Dr. Nagpal might visit these two important centres of mandarin orange production, and in consultation with the local Horticultural Officers, suggest a scheme for consideration at the next meeting of this Committee.

SUBJECT NO. F-15

INVESTIGATIONS ON DISEASES OF BANANA—WEST BENGAL—NEW SCHEME

The Eastern Regional Committee did not recommend the scheme as such, but was of view that if any provision was required for this work it should be asked for at the sub-station of the co-ordinated Banana Research Scheme already functioning in West Bengal. The proposal may, therefore, be sent by the State Government before the meeting of the Scientific Committee was held.

Plant Diseases Committee

It was explained that it was intended to study the reaction of various varieties of banana to Panama wilt. The Committee felt that technically the scheme was sound and that the work should be carried out but that the provision should be made along with the other banana scheme, and work carried out under the technical supervision of the State Plant Pathologist.

Horticulture Committee

The Committee did not recommend this scheme, but endorsed the recommendations made already by the Regional Committee. A revised scheme which had been suggested to be formulated in the light of the recommendations of the Regional Committee is still awaited.

SUBJECT NO. F-16

RESEARCH ON PINE-APPLE—WEST BENGAL—NEW SCHEME

The Eastern Regional Committee considered that work in the scheme was an important one, but did not agree that only a Research Assistant should be put in charge of this scheme. As regards contingencies, no details were given, but the provision made was much on the higher side. The location of the scheme was also not indicated. The State Government may be requested to ask their representative on the Scientific Committee to furnish details when the scheme was considered by the Scientific Committee.

Horticulture Committee

The Committee recognised that a scheme for work on pine-apples in West Bengal was necessary but suggested that certain changes should be made in the scheme under notice on the lines of the Model Scheme suggested by this Committee already for pine-apple work. The Committee felt that that the receipts had been under-estimated in the present scheme and should be put at Rs. 10,000. It was ascertained during the discussion that the area to be devoted for the work would be six to seven acres and the centre of work would be at Mongpo in Darjeeling district. The provision under T.A. was suggested to be reduced to Rs. 750 for the first year and to Rs. 500 per annum for the remaining years. Under miscellaneous expenses, the provision should be reduced to Rs. 1,000 towards furniture, which is to be met entirely by the State Government. The remaining amount towords stationery, stamps etc., should be reduced to Rs. 500 only per annum. The provision for tools, equipments etc., may be reduced to Rs. 500 per annum in the first year and

Rs. 250 per year in subsequent years. The Committee had recommended under the co-ordinated scheme that for work on pine-apples, one Gazetted Officer with one Assistant should be the minimum staff. The Committee was informed that the Horticulturist who was to supervise the scheme would be about 200 miles away from the station. The Committee, therefore, felt that a Gazetted Class II Officer should be provided for in order to ensure the conduct of work on desired lines.

SUBJECT NO. F-18

INTENSIFICATION OF RESEARCH ON MANGO—WEST BENGAL

Horticulture Committee

The Scheme was recommended on the condition that the Technical Programme was altered to conform to the Model Programme already framed by the Committee for such coordinated research centres. The estimated expenditure should also be modelled more or less on the lines approved for a similar scheme for Uttar Pradesh last year. Accordingly the Committee recommended that the post of one Research Assistant should be provided for on the usual pay scale of the State Government. The T.A. Provision should be increased from Rs. 500 to Rs. 750 per year in view of the increased strength of staff now suggested. Under contingencies, the provision may be reduced from Rs. 13,500 in the first year to Rs. 8,000 which amount should be provided in each of the subsequent years.

SUBJECT NO. F-19

INTENSIFICATION OF RESEARCH IN MANGO AND CITRUS—PUNJAB

Horticulture Committee

The scheme was recommended subject to the deletion of item No. 3 which deals with the comparative study of orchard performance of the budded and seedling plantations.

SUBJECT NO. F-20

INTENSIFICATION OF RESEARCH IN PINE-APPLE, ASSAM

Horticulture Committee

The scheme was recommended for approval with the following modifications:—

1. The study of sexual methods of propagation was unnecessary.
2. Of the two peons provided in the scheme one should be deleted.
3. Since the area of the proposed station is not specified, it is not possible to examine the estimates. It is, however, recommended that presuming that the area would be six to seven acres as in the West Bengal scheme sanctioned separately by the Committee, the estimates may be modelled on the same lines.
4. The receipts have not also been indicated. These may be estimated in the same manner as in the scheme for West Bengal.

SUBJECT NO. F-22

FRUIT RESEARCH, ORISSA (EXTENSION)

Being placed directly to the Advisory Board.

SUBJECT NO. F-23

BANANA RESEARCH SCHEME, ADUTHURAI—EXTENSION—MADRAS

The Southern Regional Committee stated that State Government have not stated the reasons in the extension proposal for not shifting the present site of the station at Aduthurai to some other area not subject to cyclones. The State's representative attending the meeting of the Scientific Committee should furnish this information. Subject to these observations, the Committee recommended the extension of the scheme for four years to make it co-terminus with the schemes in Bombay and West Bengal.

Horticulture Committee

The Committee recommended the continuation of the scheme for four years to make it co-terminus with the schemes in Bombay and West Bengal, but suggested that lay-out plans in the case of all experiments should first be got approved by the Statistical Adviser, Indian Council of Agricultural Research and that the pay and other emoluments of the Lower Division Clerk, Store Clerk and Typist should be met entirely by the State Government. The Committee also recommended that the lease amount or the cost of land should be borne by the State Government.

SUBJECT NO. F-24

RESEARCH ON CASHEWNUT, TRAVANCORE-COCHIN (EXTENSION)

Being placed directly to the Advisory Board.

SUBJECT NO. F-25

CO-ORDINATION SCHEME FOR THE PRESERVATION AND STORAGE OF FRUITS AND VEGETABLES BY THE USE OF HORMONES AND CHEMICAL—EXTENSION

Horticulture Committee

After reviewing the progress made in each of the existing centres the Committee recommended that the future work should be restricted to Mysore, Gauhati and Kulu for one year. During the period of extension, it is necessary that emphasis should be laid on devising improvements in drying under ordinary room temperature, for devising convenient and economic applicators, and for determining the residual effects of the wax or its toxicological hazards. Since it is understood that there are some other ancillary aspects including the comparative effects of pure chemicals and other proprietary substances, the Committee recommended that a full report on all these investigations should be compiled and presented to this Committee for consideration during its next meeting.

SUBJECT NO. F-27

MICRO-NUTRIENT SCHEME, COORG—ADDITIONAL GRANT

Horticulture Committee

The Committee recommended that the expenditure already incurred on some items, which appear inevitable, may be ratified.

SUBJECT NO. F-30

PROPOSAL FOR CONSTRUCTION OF BUILDINGS AT PASHULOK (U.P.) UNDER THE HORTICULTURAL PLANT INTRODUCTION SCHEME

Horticulture Committee

Since this is a scheme sponsored by the Indian Council of Agricultural Research, the entire expenditure has to be normally met by that body. Considering that the State Government have volunteered to give an area of about seven acres of land for work under this scheme and in view of the scarcity of residential accommodation in the site selected for this work, the Indian Council of Agricultural Research may arrange to put up the buildings as explained in the note at a cost of about Rs. 60,000.

SUBJECT NO. F-31

PROPOSAL FOR UNIFIED CONTROL OF FRUIT SCHEMES IN HIMACHAL PRADESH

Horticulture Committee

The proposal to have unified control of the two separate fruit schemes in Himachal Pradesh was recommended.

SUBJECT NO. F-33

PROPOSAL FOR OBTAINING THE SERVICES OF AN ITALIAN EXPERT IN HORTICULTURE—NOTE—INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Horticulture Committee

The Committee recommended that it would be useful if an Italian expert well acquainted with sub-tropical and temperate region Horticulture is available, for assignment to this country. The Committee presumed that the choice of the expert would be made in consultation with the F.A.O. experts.

SUBJECT NO. F-35

REPORT OF THE SUB-COMMITTEE OF THE HORTICULTURE COMMITTEE REGARDING DETAILED PROPOSALS FOR ESTABLISHMENT OF REGIONAL STATIONS FOR INTENSIFICATION OF RESEARCH ON IMPORTANT FRUITS

The Horticulture Committee

The Committee considered the recommendations made by the Special Sub-Committee for the establishment of regional stations for intensification of research on the more important fruits of the country. It was recommended that the country should be divided into five main regions so that the problems in the respective regions could be tackled at one of the established centres to be developed into a main research station for that region. On this basis, the Committee suggested the following regions to be constituted:

1. The Southern Tropical Zone with the main station at Kodur.
2. The Central Tropical Zone with the main Station at Poona.
3. The North-Eastern Zone with the main station as Sabour.
4. The North-Western Zone with the main station at Saharanpur-Rishikesh.
5. The Temperate Zone with the main station at Mashobra.

Considering the varied nature of the problem within a region and the large number of fruits to be tackled, the Committee suggested that sub-stations in some of the leading centres of production within a region may be established to work under unified guidance of the regional station. The Committee accordingly suggested the following sub-stations under each of the main regional stations mentioned above.

Zones	Main Station	Sub-Station
Southern Tropical		
Kodur	Mango, citrus and grapes.	
Trichy	..	Banana.
Goricoppal (Coorg)	..	Citrus.
Hasaraghatta	..	Plant Introduction Station.
Central Tropical		
Poona	Citrus, grape and mango.	Banana.
Nagpur	..	Citrus (Mandarin).
North-Eastern		
Sabour	Mango and Litchi.	..
Krishnanagar (W. Bengal)	..	Banana and Mango.
Assam	..	Pine-apple and citrus mandarin.
North-Western		
Saharanpur-Rishikesh	Mango and litchi	..
Basti (U.P.)	..	Mango and guavas.
Sirsa (Punjab)	..	Citrus and grapes.
Sri Ganganagar (Rajasthan)	..	Date palm.
Temperate		
Mashobra (Himachal Pradesh)	Apple, cherry and pea.	..
Khadaghat (Punjab)	..	Peaches, plums and apricot.
Srinagar	..	Apple, cherry and walnut.

With the linking of the sub-stations to the main regional stations, the formulation of the technical programmes and the conduct of work may be vested with the Officers incharge of the regional stations.

With regard to the financing of these various stations under the proposed scheme for intensification of research on a regional basis, the Committee suggested that the existing resources in each of the stations or sub-stations should first be assessed and then the requirements for the future estimated; the former should be taken as the basis for determining the extent of contribution to be made by the Indian Council of Agricultural Research, treating the entire existing resources of the existing centres as 50 per cent of the share for the gross requirements for the working of the scheme.

The Committee suggested that based on this model a small Sub-Committee may draft detailed programmes of work for each of the main and sub-stations indicating, at the same time, the requirements of staff and facilities.

The sub-committee may consist of Dr. S. M. Sikka, Dr. R. L. Nagpal and Dr. L. B. Singh.

SUBJECT NO. F-48

SCHEME FOR IDENTIFICATION AND FOR DEVISNG CONTROL MEASURES OF SERIOUS DISEASES IN GUAVA (AJMER)

Being placed directly to the Advisory Board.

SUBJECT NO. F-49

SCHEME FOR THE ESTABLISHMENT OF SUB-HUMID TROPICAL, HORTICULTURAL RESEARCH STATION ON TIRUPATHI HILLS IN ANDHRA STATE—NEW SCHEME

Horticulture Committee

The Committee felt that the maintenance of a variety collection plot to determine broadly the varieties and kinds of fruits, beverages, spices and other plantation crops as well as vegetables suitable for Tirupathi Hills, is all that would be necessary; and for this purpose an area of ten acres may be adequate. It may be in-charge of a trained horticultural assistant with the aid of a Mali. The scheme may be revised on these lines for approval.

SUBJCET NO. F-52

CITRUS FRUIT RESEARCH, BOMBAY (FORMERLY IN MADHYA PRADESH)—EXTENSION

Being submitted directly to the Advisory Board.

G.—VEGETABLES

SUBJECT NO. G-1

ONION RESEARCH—NEW SCHEME—ANDHRA

The Southern Regional Committee recommended the scheme as proposed by the State Government and suggested that the title of the scheme should be modified to read 'Scheme for research on onions in Andhra State'.

Agrowomy Committee

The scheme was approved. It was also noted that the receipts during the five years of the scheme would amount to Rs. 16,000 as 50 per cent share of the I.C.A.R.

Horticulture Committee

The Committee recommended the scheme suggesting, however, that the possibility of integrating various agronomic experiments in a factorial trial should be examined while preparing the detailed technical programme and that large scale introduction of varieties should also be attempted from other regions in order to evolve the best for commercial production.

SUBJECT NO. G-2

IMPROVEMENT OF ONION AND GARLIC—WEST BENGAL—NEW SCHEME

The Eastern Regional Committee recommended the scheme.

Horticulture Committee

The Committee recommended the scheme. It however, suggested that provisions for leave salary and I.C.A.R. Provident Fund should be made in the scheme.

SUBJECT NO. G-3

SCHEME FOR THE CULTIVATION OF MUSHROOMS—NEW SCHEME—HIMACHAL PRADESH

The Northern Regional Committee did not recommend the scheme in its present form. It was of the view that arrangement should be made for the training of an officer in the commercial growing of mushrooms. The revised proposals should be of the nature of a research-*cum*-development project dealing with the production of spawn for sale to the public for improving the productivity of the natural production grounds in the hilly areas.

Horticulture Committee

The Committee felt that intensified work on the cultivation of edible mushroom in Himachal Pradesh was very important, and towards this end an officer from the State might be selected and deputed for training to Europe. On the completion of the training the Officer may be asked to formulate a scheme both for research and development activities in this field. The scheme submitted by the Himachal Pradesh was not recommended.

SUBJECT NO. G-4

INTERGENERIC, INTERSPECIFIC, AND INTERVARIETAL, HYBRIDIZATION IN CUCURBITS AND SOLANACCOUS CROPS PLANTS, WEST BENGAL—NEW SCHEME

The Eastern Regional Committee noted that there was no indication about the preliminary work on the scheme having been carried out at the Calcutta University. The Committee, therefore, decided that the Scientific Committee should carefully examine if the scheme was in order and if any fruitful results would emerge from proposed investigations.

Horticulture Committee

In view of the fact that a separate Vegetable Improvement scheme is already functioning under the West Bengal Agricultural Department, a scheme for hybridization on a few vegetable crops was not considered necessary.

SUBJECT NO. G-5

ESTABLISHMENT OF VEGETABLES RESEARCH STATION—NEW SCHEME—ANDHRA

The Southern Regional Committee was informed by the State's representative that the State Government would submit a revised Scheme. It was, therefore, not considered by the Committee in its present form.

Horticulture Committee

As there is already a vegetable Research Station functioning in the State with headquarters at Hyderabad, a separate research station for vegetables was not considered necessary. The committee, however, recommended that if the State was eager to expand the work of the existing station to include breeding in any of the vegetables, a proposal for additional facilities to undertake such work might be formulated early, and if the proposal is received in time, the same might be considered by the Advisory Board in December, 1956.

SUBJECT NO. G-6

IMPROVEMENT OF ROOT CROPS—WEST BENGAL—NEW SCHEME

The scheme was recommended by the Eastern Regional Committee subject to the staff etc., being scrutinised by the Scientific Committee

Horticulture Committee

The Committee recommended that scope of work should be limited merely to agronomic trials, in view of the fact that breeding of some of these crops is already engaging the attention of some other I.C.A.R. Schemes. The staff and facilities to be provided for such a scheme might be on the same scale as for the co-ordinated schemes on tapioca and sweet potatoes, now working in States like Punjab, Bombay, Madras etc.

SUBJECT NO. G-7

TAPIOCA AND SWEET POTATO—EXTENSION—TRAVANCORE-COCHIN

In the absence of previous papers regarding this scheme, the Committee was not able to carefully scrutinise the strength of staff proposed during the extension period. However, the Southern Regional Committee recommended that the number of Research and Graduate Assistants should not exceed the number of crops under investigation, the number of peons may be reduced from 3 to 2 and the typist should be paid for by the State Government. It was further recommended that the Officer-in-Charge of the scheme may be asked to indicate the amount of receipts to be realised in five years.

Horticulture Committee

The Committee felt that in view of the increased number of crops that are taken up for investigation, the additional staff sought for may be approved. The Committee also recommended that the cost on the Typist should be met exclusively by the State Government. The recommendation made in the previous meeting was reiterated to the effect that the promising material should be sent out to all tuber research centres in various States.

SUBJECT NO. G-8

RESEARCH ON TUBER CROPS—BIHAR—EXTENSION

The Eastern Regional Committee recommended the extension proposal on the following conditions: (i) the work on 'haldi' should be excluded; (ii) only one peon will be sanctioned; (iii) the clerk would be provided by the State Government; (iv) the T.A. grant would be Rs. 2,000 in first year and Rs. 1,000 in each of the subsequent years. The Scientific Committee should scrutinise the programme of work carefully.

Horticulture Committee

The Committee recommended that all work on hybridization may be deleted in view of the fact that a separate scheme to work on crop improvement in tubers is functioning within the State at the Central Potato Research Station. The provision under T.A. was suggested to be reduced by Rs. 300 per annum, and the number of peons to one. The State Government should be asked to bear the cost on the clerk as in all other schemes. Since no estimates of receipts have been furnished, the Committee recommended that this omission should be made good and that an estimated receipt of Rs. 500 per annum may be adopted for the present.

H—SPICES & MISCELLANEOUS CROPS.

SUBJECT NO. H-1

CARDAMOM SCHEME—NEW SCHEME—COORG

The Horticulture Committee while considering the scheme recommended that since a cardamom research scheme is already functioning in Mysore State at present, the Committee did not feel it necessary to consider a separate scheme for the same State.

The *Botany Committee* agreed with the Horticulture Committee and did not recommend the scheme.

SUBJECT NO. H-2

PAN SCHEME—NEW SCHEME—U.P.

The *Eastern Regional Committee* recommended the scheme and suggested that the Agronomy Committee and the Plant Diseases Committee would carefully examine the programme of work as it was not clear whether it was a disease control scheme or a scheme for the improvement of 'pan' varieties. The Indian Council of Agricultural Research would share the net expenditure of the scheme on a 50:50

basis. The details of contingent expenditure will have to be obtained from the State Government as the provision of Rs. 12,000 per acre for cultivation charges was considered to be very excessive.

The *Agronomy Committee* while considering the scheme recommended that the scheme is a botanical scheme and may, therefore, be referred to Botany Committee, for their consideration.

The *Horticulture Committee* suggested that the Uttar Pradesh Government should arrange for raising a plantation of one acre of irrigated land at its own cost and that the Indian Council of Agriculture Research should agree to sanction the funds for the appointment of staff consisting of one Research Assistant on Rs. 200 per mensem with one Attendant and one Watchman, as asked for in the proposals. The entire recurring expenditure on the pay and allowances of establishment should be borne in the ratio of 50:50 between the State Government and the Indian Council of Agricultural Research.

Plant Diseases Committee

In view of the fact that the measures for the control of the disease are already known, it would be desirable if the workers in the States visit Basin area in Bombay where the control measures are being practised. As far as the study of namotodes is concerned it is being taken up in Bombay. The Committee did not, therefore, recommend the scheme.

Botany Committee

In view of the fact that the measures for the control of the disease that at present there is no centre at which a collection of all the varieties of *pan* were being grown the Committee recommended that the scheme may be sanctioned for work on the collection and assessment of the pan varieties found in the country. The study of these stocks would indicate whether or not varieties resistant to different diseases of *pan* were available. The Committee suggested that work on diseases should be omitted from the programme and as recommended by the Plant Diseases Committee the States interested might send representatives to study the control measures which had been successfully worked out in Bombay State. Later on, after the study of the collection had been made, the need or desirability of taking up other lines of work would become clear. Regarding staff the Committee recommended that this may be provided in the manner suggested by the Horticulture Committee, namely, one Research Assistant, with a starting pay of Rs. 200 per month, one Attendant, and one Watchman and the State Government should provide the land. Regarding contingencies the Indian Council of Agricuflural Research may obtain the details from the Officer-in-Charge of the scheme and make provision for the amount actually required in the scheme as now revised. The recurring expenditure and the receipts should be shared between the State Government and the Council on 50:50 basis. The Committee considered that one acre of land or even less might be sufficient for the scheme as now envisaged. The scheme was recommended for three years in the first instance.

SUBJECT NO. H-3

PAN RESEARCH—NEW SCHEME—MADRAS

The Horticulture Committee recommended the sanction of this scheme also on the same conditions as that for Kanpur *i.e.,* the State Government should bear the cost of establishment and maintenance of one acre of irrigated pan plantation while the cost of pay of establishment allowances should be borne equally by the Indian Council of Agricultural Research and the State Government. The receipts may be credited to the State Government.

The *Agronomy Committee* while considering the scheme recommended that the scheme is a Mycological scheme and may, therefore, be referred to the Plant Diseases committee for their consideration.

Plant Diseases Committee

In view of the fact that the measures for the control of the disease are already known, it would be desirable if the workers in the States visit Basin area in Bombay where the control measures are being practised. As far as the study of namotodes is concerned it is being taken up in Bombay. The Committee did not, therefore, recommend the scheme.

SUBJECT NO. H-4

IMPROVEMENT OF LEMON GRASS—NEW SCHEME—TRAVANCORE-COCHIN

The Horticulture Committee recognised the importance of undertaking intensified research on the improvement of lemon grass. It suggested that if a detailed technical programme indicating the specific items of work in the agronomic and breeding aspects is implemented there would be scope for imparting considerable benefit to the industry. The Committee felt that the estimates submitted in the present proposals were adequate, but the work should be under the personal direction of a trained Botanist who should be appointed on the Class II scale. The scheme was recommended to be approved on the above conditions provided its implementation is deferred till the detailed technical programme is approved by this Committee in its next Spring Meeting.

The *Botany Committee* agreed with the Horticulture Committee that this was an important essential oil yielding plant which required immediate attention, and recommended the scheme on the lines suggested by the Horticulture Committee. Regarding the programme of work, the Committee recommended that in the beginning the work may be restricted to the botanical and breeding aspects given under item 'A' of the programme of work. Distillation work should, however, be permitted to the extent necessary to assess the value of the different clones. As regards the budget of the scheme, it was recommended that the clerk and the typist should be provided by the State Government, as also all the non-recurring expenditure. The contingencies may be provided at Rs. 5.000 per annum and the area may be reduced in accordance with the modified programme of the work.

SUBJECT NO. H-5

SCHEME FOR RESEARCH ON PEPPER AND CARDAMOM—NEW SCHEME—ORISSA

The *Eastern Regional Committee* recommeded this scheme provided the work was restricted to cardamom and pepper only and was carried out on the model of other schemes already sanctioned. The scheme should be in charge of a Class II Officer and the programme of work should be prepared in consultation with the Officer on Special Duty (Spices). The scheme should also be put up to the Spices Committee for approval.

The Horticulture Committee felt that there was no need to do any research work on coffee under the auspices of the Indian Council of Agricultural Research as there was a separate Board to deal with these matters. Relating to pepper and cardamon, since these crops are new to the State it is desirable for the Orissa Agricultural Department to depute an Officer to Travancore-Cochin State to study the plantation practices in these two crops before formulating or embarking on such schemes of research. The Committee, however felt that introductions and trials of varieties of these plantation crops would be definitely worthwhile, and a scheme for the establishment of such varietal study plots may be invited from the State Government.

The Botany Committee agreed with the Regional Committee and the Horticulture Committee and recommended the scheme for work on Pepper and Cardamom on the usual basis. It was, however. suggested that a Senior Officer from Orissa should visit important cardamom and pepper growing areas in Kerala State and Mysore in order to study the methods utilised in the growing of these crops. In Orissa, emphasis should be laid on trails of introduced material from the regions where these crops are already grown on a commercial scale. In obtaining material. great care should be taken to ensure that only disease-free stocks are brought into the State. The scheme should be in charge of a Class II Officer, and a clear programme of work should be submitted.

SUBJECT NO. H-6

IMPROVEMENT OF SPICES—NEW SCHEME—DELHI UNIVERSITY

The *Northern Regional Committee* recommended the scheme subject to the proviso that the air-conditioner should be provided by the University. The higher initial pay proposed to the research staff will have to be justified.

Horticulture Committee

Since, this is purely a fundamental research in the field of Botany, the Committee recommended that the Botany Committee may be invited to examine this carefully.

Botany Committee

The scheme was recommended for sanction subject to the proviso that the air-conditioner should be provided by the University. As regards the higher initial pay proposed to be given to the Research staff, it was suggested that this may be sanctioned only if suitable and qualified staff on lower pay does not become available.

SUBJECT NO. H-7

SCHEME FOR THE REGIONAL IMPROVEMENT OF CHILLIES NEW SCHEME—ANDHRA

The Southern Regional Committee recognised that the State of Andhra was an important chilli growing state and research on chillies should therefore, be continued in this State, but it should form part of the co-ordinated chilli research scheme. The Botany Committee should, therefore, examine as to how the work proposed by the State Government could be done as part of the co-ordinated scheme.

Horticulture Committee

Since a chilli improvement scheme is already in operation in Andhra State, the Committee did not feel it necessary to recommend fresh scheme on the same crop at this stage.

The Botany Committee considered this scheme and extension proposal (H. 16) together and recommended the scheme provided the programme of work laid down for the Model scheme is followed. It was noted that in the revised scheme staff was provided in accordance with the Model Scheme except that in place of Research Assistant a Gazetted Officer was proposed. In view of the fact that this officer had been in charge of the scheme which had been running for a number of years and in view of the special importance of chillies in Andhra, the Committee recommended that, as a special case, this post may be allowed on the condition that this experienced officer was retained.

SUBJECT NO. H-8

CORIANDER SCHEME—NEW SCHEME—MADRAS

The Southern Regional Committee was of the view that the work proposed in this scheme should form part of the Co-ordinated scheme on Essential Oil-bearing Plants. The Scientific Committee should, however, scrutinise the programme of work and if certain items of the programme were not already included in the programme of the co-ordinated scheme, the same should be incorporated.

The Horticulture Committee endorsed the recommendation of the Regional Committee that the work should be limited only to items in the programme not already included in the sanctioned scheme on essential oil-bearing plants at the Indian Agricultural Research Institute. It, therefore, suggested that the Botany Committee may look into this and formulate their recommendations.

The Botany Committee recommended that in view of the fact that there was now a Co-ordinated Essential Oil scheme and material would be available for distribution for trial in other areas, the question of starting new schemes may be deferred for the present.

SUBJECT NO. H-9

ADDITIONAL STAFF FOR THE ESTABLISHMENT OF A RESEARCH STATION FOR THE SPICES PLANT INTRODUCTION IN WYNAD—NEW SCHEME—MADRAS

As in the case of establishing plant collections for bananas the Horticulture Committee recommended that the augmenting of plant collections should be an integral part of the existing schemes, and the work should be done in collaboration with the plant introduction station for the Southern region.

Botany Committee

In view of the fact that a Plant Introduction Organisation with the Regional station had been sanctioned by the Government of India, the *Botany Committee* did not feel that a separate scheme was necessary at present.

SUBJECT NO. H-10

TURMERIC SCHEME—NEW SCHEME—WEST BENGAL

In view of the fact that the area under turmeric in West Bengal was small and considerable work had already been done in Orissa, the *Eastern Regional Committee* did not consider it necessary to recommend the scheme.

The Horticulture Committee endorsed the recommendations of the Regional Committee adding that the work of the scheme need not be approved in view of the fact that the results of research done in Orissa could be of application in West Bengal also.

Botany Committee

It was explained to the Botany Committee that conditions in the area of Bengal where turmeric was grown were very different from those in Orissa where quite a lot of work had been done on this crop. While the Committee felt that there might be a case for undertaking a certain amount of work, the necessary detailed information regarding the progress made in Bengal on the cultivation of the crop and the areas in which the work is proposed to be taken up should be provided. It was noticed that no information was given regarding the work done on this crop in other parts of India. This information should also be supplied in the revised scheme which may be considered on its merits in the next meeting of the Botany Committee.

SUBJECT NO. H-11

PAN SCHEME—NEW SCHEME—MADHYA BHARAT

The *Southern Regional Committee* was of the view that the Scientific Committee might carefully examine whether or not the scheme should be sanctioned.

The *Agronomy Committee* recommended that this is a Mycological scheme and may be referred to the Plant Diseases Committee for their consideration. The Committee felt that the agronomic part of the scheme need not be taken up as a part of this scheme.

The Horticulture Committee recommended that since schemes on the subject had already been recommended for Uttar Pradesh and Madras, the Committee suggested that this scheme should also be sanctioned on the same basis adopting the same estimates.

Plant Diseases Committee

In view of the fact that the measures for the control of the disease are already known, it would be desirable if the workers in the States visit Basin area in Bombay where the control measures are being practised. As far as the study of namotodes is concerned it is being taken up in Bombay. The Plant Diseases Committee did not, therefore recommend the scheme.

SUBJECT NO. H-13

TURMERIC SCHEME—NEW SCHEME—ORISSA

Horticulture Committee

Since a turmeric improvement scheme was in operation in Orissa for about 12 years and since this Committee had recommended last year that the results of agronomic research should be translated into the field and that no further extension was necessary, the Committee was unable to recommend the continuance of research on agronomic aspects of this crop as proposed in the present scheme.

Botany Committee

The *Botany Committee* agreed with the remarks of the Horticulture Committee and did not recommend the scheme.

SUBJECT NO. H-14

SPICES AND CASHEWNUT SCHEMES—NEW SCHEME—I.C.A.R.

Horticulture Committee

The Committee endorsed the recommendation contained in the Indian Council of Agricultural Research note to organize exhibitions and demonstrations of improved methods of production in respect of these two crops. The details of the exhibition, the venue and the kind of demonstrations to be organized may all be left to be decided by a Regional Committee where prospective exhibitors, and planters may be represented. The Committee felt that January may not be a suitable month for holding an exhibition for cashew.

SUBJECT NO. H-15

RESEARCH ON COCOA—NOTE—I.C.A.R.

The Horticulture Committee recognised the importance of developing cocoa cultivation to as large an extent as possible in all the States where conditions permit such expansion. The possible centres for such cultivation may be the Travancore-Cochin, Madras Malnad areas of Mysore, West Coast regions of Bombay, parts of Orissa, Andhra and Assam. A detailed popular note bringing out the value and importance of expanding cocoa cultivation may be got prepared and circulated to the planting communities in the various States mentioned above and also to the State Governments urging the latter to give all possible fillip to this industry. The seed of the Criollo variety may be conserved and distributed mainly to the Centres where cocoa is to be tried rather than to individual indentors who may be interested in raising a few large plantations.

Botany Committee

It was observed that the Horticulture Committee had considered the note. The *Botany Committee* had no comments to offer.

SUBJECT NO. H-16

CHILLIES SCHEME—EXTENSION—ANDHRA

Regional Committee

It was decided last year that the Andhra scheme for research chillies, which is already in operation, should be suitably modified to fit in with the co-ordinated chilli research scheme. The *Southern Regional Committee,* therefore, recommended that the State Government may be requested to submit revised proposals on these lines before October, 1956 for the consideration of the Scientific Committee. If the revised scheme was not received in time, the present scheme would be terminated by the end of February, 1956.

Horticulture Committee

The revised extension proposals are observed to contain items of work which are not included in the model Programme drawn up by the Botany Committee. These are, however, items which were already in progress at this centre and financed jointly by the Indian Council of Agricultural Research and the State Government. The continuance of work on these items being necessary, the Committee recommended that the extension proposals should be approved with the scale of staff suggested in the revised proposals.

The Botany Committee considered the chillies improvement scheme (H.7) and this scheme together and recommended the scheme provided the programme of work laid down for the Model scheme is followed. It was noted that in the revised scheme staff was provided in accordance with the Model Scheme except that in place of Research Assistant a Gazetted Officer was proposed. In view of the fact that this officer had been in charge of the scheme which had been running for a number of years and in view of the special importance of chillies in Andhra, the Committee recommended that, as a special case, this post may be allowed on the condition that this experienced officer was retained.

I.—MEDICINAL PLANTS

SUBJECT NO. I-1

POSSIBILITIES OF THE CULTIVATION OF CINNAMON CAMPHORA IN WYNAD—NOTE (I.C.A.R.)

Medicinal Plants Committee

The Scheme was discussed and recommended. A revised scheme on the lines of the proforma of the I.C.A.R. should be submitted.

SUBJECT NO. I-3

MEDICINAL PLANTS SCHEME, F.R.I. (EXTENSION)

The Northern & Temperate Regional Committee recommended the scheme subject to the scrutiny by the Scientific Committee.

Medicinal Plants Committee

Recommended.

SUBJECT NO. I-4

MEDICINAL PLANTS SCHEME, ASSAM (EXTENSION)

Direct to the Advisory Board.

SUBJECT NO. I-5

ERGOT SCHEME, WEST BENGAL (EXTENSION)

The Plant Diseases Committee recommended the extension of the scheme on existing basis and suggested that Mr. Ramakrishnan should visit the Station and give a report regarding the progress and organization of work, and whether in view of his experience the technique followed was a correct one. The question of provision of additional funds for labour would be considered on the basis of the area after the report of Mr. Ramakrishnan is available to the Committee. The Committee recommended the scheme and suggested that a sum of Rs. 500 for Contingencies per annum and Rs. 1,000 for apparatus and chemicals and staff on existing basis be provided. Special pay asked for the Officer-in-charge could not be recommended.

Medicinal Plants Committee

Recommended. Dr. Ramakrishnan may visit the scheme and give his report.

J.—ENTOMOLOGY

SUBJECT NO. J-1

STUDY OF THE RATE OF DECOMPOSITION OF INSECTICIDAL DEPOSITS—NEW SCHEME—HYDERABAD DECCAN

Southern and Coastal Regional Committee

The Committee recommended that the Officer-in-charge of the scheme should be asked to furnish details about the special apparatus required by him before the Scientific Committees met in October this year. It was further observed that a provision of Rs. 1,100 for books was not necessary in a small scheme of this nature. With these observations, the Committee recommended that the Scientific Committee should carefully examine the revised scheme when received.

Soil Science Committee

The Committee remarked that the subject of proposed study was important and deserved support. The Committee recommended the scheme for sanction.

Entomology and Animal Pests of Crops Committee

The Committee was of the opinion that the scheme was an important one. The Committee also noted that there was a well qualified scientist to guide the research work envisaged in the Scheme.

The Committee, however, was of the opinion that the technical programme should be vetted after reference to the Malaria Institute of India, Indian Veterinary Research Institute and the National Chemical Laboratory. The Committee recommended the acceptance of the scheme.

SUBJECT NO. J-2

SCHEME FOR "BIO-ASSAY" OF INDIGENOUS PLANT INSECTICIDES—NEW SCHEME—U.P.

Eastern Regional Committee

The Committee did not recommend the scheme in view of the fact that it was necessary first to isolate the toxic principles in pure form. Such work can best be done at the National Chemical Laboratory, Poona.

Entomology and Animal Pests and Crops Committee

The Committee was of the opinion that the Scheme should first be examined in detail by the representatives of the Entomology, Botany, Plant pathology and Medicinal plant Committees and their comments and recommendations should then be placed before this Committee for consideration. The Committee was unable to recommend the scheme at this stage.

SUBJECT NO. J-3

RESEARCH AND INVESTIGATION ON EEL WORM PEST IN CROPS—NEW SCHEME—U.P.

Eastern Regional Committee

The Committee did not recommend the scheme in its present form, but if it was suitably revised on the I.C.A.R. *proforma* and the State Government indicated that 50 per cent of the cost would be borne by them, the Scientific Committee may examine their revised scheme, if received from the State Government.

Entomology & Animal Pests of Crops Committee

The Committee observed that the scheme had not been submitted in the proper proforma. The specific problem that would be tackled, whether any preliminary work had been carried out and whether any trained personnel is available to guide and carry out the research work had also not been stated. In view of these drawbacks the Committee was unable to recommend the scheme.

SUBJECT NO. J-4

SCHEME FOR BUILDING UP NAMED REFERENCE COLLECTIONS OF INSECT PESTS AT THE AGRICULTURAL COLLEGE BAPATLA (ANDHRA)

The Southern and Coastal Regional Committee

The Committee was of the view that the work in this scheme should be done by the State Entomologist as his normal work. Hence the scheme was not approved. The scientific Committee may, however, examine the scheme.

Entomology & Animal Pests of Crops Committee

The Committee was of the opinion that the work envisaged in the Scheme was a part of the State Entomolgist's normal activities. A similar scheme was sanctioned for Madras because when Madras was a composite state one or two eminent entomologists had build up a fairly good collection there and the Committee felt that the collection should not be left unattended. The Committee advised the Andhra Entomologists to get duplicates of name specimens from the Government Entomologist, Coimbatore. The Committee was unable to recommend the Scheme.

SUBJECT NO. J-5

SCHEME FOR STUDIES IN SECURING THE HELP OF NATURAL ENEMIES OF INSECT PESTS (NEW SCHEME), AGRICULTURAL COLLEGE BAPATLA (ANDHRA)

The Southern and Coastal Regional Committee

The Committee observed that this was general scheme without any definite objective. It, therefore, recommended that the Scientific Committees should examine whether the information already available should not be utilised by the State Government.

Entomology & Animal Pests of Crops Committee

The Committee felt no definite objective had been stated in the scheme. The specific pest problem and its control by parasites or predators had also not been stated. The Committee was of the opinion that the Scheme should be revised in the light of the above remarks and sent again for consideration by the Committee.

SUBJECT NO. J-6

SURVEY STUDY AND CONTROL OF SOIL INHABITING INSECTS HARMFUL TO AGRICULTURAL AND HORTICULTURAL CROPS, NEW SCHEME—U.P.

Eastern Regional Committee

In view of the fact that several schemes have been received on the same subject, the Scientific Committee should decide as to which of these schemes should be taken up and where the work should be carried out with due regard to the experience of the person to be entrusted with the work.

Entomology & Animal Pests of Crops Committee

The specific objective of the research work to be carried out had not been stated. The Committee was of the opinion that the proper way to carry out a work of this nature was to undertake the survey of an important soil pest and study its other associated insects. The Committee was unable to recommend the scheme in its present form.

SUBJECT NO. J-7

TERMITE RESEARCH (CONTROL)—NEW SCHEME—F.R.I.

Northern and Temperate Regional Committee

The Committee did not recommend the scheme as in its view the work envisaged did not fall within the purview of the Indian Council of Agricultural Research.

Entomology & Animal Pests of Crops Committee

The Committee observed that the work carried out so far and the work envisaged in continuation of the work already carried out, that had been promised during the last meeting had not been given. The Committee also felt that this scheme did not come within the purview of the Indian Council of Agricultural Research. Under these circumstances, the Committee was unable to recommend the scheme

SUBJECT NO. J-8

INVESTIGATIONS ON THE NATURE AND EXTENT OF DAMAGE BY SUCKING INSECTS—NEW SCHEME—PUNJAB UNIVERSITY.

The Northern & Temperate Regional Committee

The Committee did not recommend this scheme.

Entomology & Animal Pests of Crops Committee

The Committee observed that an account of the work carried out so far in the laboratory and the field had not been given. The Committee also felt that the objective of the scheme in relation to the applied aspect had also not been clearly indicated. The Committee was unable to recommend the scheme.

SUBJECT NO. J-9

STUDIES ON THE SOIL FAUNA—NEW SCHEME—PUNJAB UNIVERSITY

Northern & Temporate Regional Committee

The Chairman informed the members that Dr. K. D. Bawaja who had retired from the B.H.U. had already submitted a proposal to this type of work at the Indian Agricultural Research Institute, New Delhi. In view of this, the Committee was of the view that the Scientific Committee should examine whether the work should be done at the I.A.R.I. or at Hoshiarpur (Punjab).

Entomology and Animal Pests of Crops Committee

The specific objective of the research work to be carried out had not been stated. The Committee was of the opinion that the proper way to carry out a work of this nature was to undertake the survey of an important soil pest and study its other associated insects. The Committee was unable to recommend the scheme in its present form.

SUBJECT NO. J-10

RESEARCH ON SOIL FAUNA PARTICULARLY INSECTS—NEW SCHEME—B.H.U.

The Eastern Regional Committee

In view of the fact that several schemes have been received on the same subject, the Scientific Committee should decide as to which of these schemes should be taken up and where the work should be carried out with due regard to the experience of the person to be entrusted with work.

Entomology & Animal Pests of Crops Committee

The specific objective of the research work to be carried out had not been stated. The Committee was of the opinion that the proper way to carry out a work of this nature was to undertake the survey of an important soil pest and study its other associated insects. The Committee was unable to recommend the scheme in its present form.

SUBJECT NO. J-11

SCHEME FOR STUDIES ON THE APHIDAE—WEST BENGAL—NEW SCHEME

Eastern Regional Committee

The Committee considered that this need not be taken up in West Bengal as persons possessing the necessary experience in this line were not available in West Bengal.

Entomology & Animal Pests of Crops Committee

As there was a qualified Entomologist in the West Bengal, who had done work on Aphids and as the subject of the biology and control of Aphids was an important one, the Committee recommended the acceptance of the scheme.

SUBJECT NO. J-12

SCHEME FOR RESEARCH ON TOXICOLOGY AND ADVERSE EFFECTS OF SYNTHETIC PESTICIDES—NEW SCHEME—MADRAS

Southern & Coastal Regional Committee

The Committee recommened that the scheme might be carefully examined by the Entomology Committee.

Entomology & Animal Pests of Crops Committee

The Committee felt that there was already a co-ordinated scheme on a more or less similar subject. The Committee however felt that some work on systematic insecticides could be usefully carried out and so recommended the scheme on a restricted basis with one assistant Entomologist, and two fieldmen. The Committee also recommended a contingent grant of Rs. 2,000.

SUBJECT NO. J-13

SCHEME FOR INVESTIGATION ON HABITS AND METHODS OF CONTROL OF FIELD RATS—MADRAS

Southern & Coastal Regional Committee

In view of the fact that control measures against rats were being taken up by the Ministry of Food and Agriculture on a large scale, it was for the Scientific Committee to decide whether further work, as proposed in the scheme, was necessary.

Entomology & Animal Pests of Crops Committee

The Committee was unable to recommend the scheme as a similar scheme had been sanctioned last year and the sanctioning of another scheme would be a duplication of the work. As regards control there was a big coordinated scheme functioning in the plant protection sections of the various States.

SUBJECT NO. J-14

FUNDAMENTAL RESEARCH ON THE TOXICITY AND MODE OF ACTION OF INSECTICIDES BY DR. H. S. PRUTHI (PUNJAB UNIVERSITY)

The Northern Regional Committee (1955)

The Committee recommended that the scheme should be scrutinised by the Scientific Committee in relation to the work already being carried out at the National Chemical Laboratory, the I.A.R.I. and other Scientific Laboratories in the country.

Entomology & Animal Pests for Crop Committee (*April* 1956)

Members of the Committee thought that the Scheme was technically very sound and an important one and that of organic insecticides. Fundamental research work could be carried out with profit at more than one centre in view of the large number of organic insecticides that were of late coming into the market and the complexity of problems involved and the variety of Indian pests. The Entomology laboratory of the Punjab University were now properly equipped. As regards the staff the Committee felt that very well qualified staff were needed but as Insect Physiologists of suitable calibre may not be available, the post of the insect Physiologist should be in the class I scale. As regards Chemist the Committee recommended a class II post with an initial start of Rs. 375 for a suitable candidate. The Committee recommended two experienced research assistants, one in Entomology and another in Chemistry in the scale of Rs. 160-330 with a starting pay of Rs. 200. The Committee was unable to recommend a typist as it was against the rules of the I.C.A.R. to give clerical assistance which should be provided by the University. The Committee recommended a store keeper in a grade prevalent in the University. The Committee also recommended corresponding reductions in Travelling and dearness allowances.

Subject to the above reductions in the grade of the staff, the Committee recommended the Scheme for acceptance and added that the work should start soon.

SUBJECT NO. J-17

SCHEME FOR RESEARCH IN THE JOWAR SHOOT CATERPILLARY AND THE JOWAR SHOOT BUG IN MALWA REGION—M.B.

Southern and Coastal Regional Committee

The Committee recommended the scheme as pests proposed to be investigated were of very great economic importance in this region. It should, however, be financed on a 50:50 basis.

Entomology Committee

The Agricultural Commissioner informed the Committee that the research work proposed to be undertaken in the Scheme would be taken up by the Regional Research Stations to be set up to carry out research work on millets, cotton and oilseeds crops. In view of this decision, the Committee did not recommend the scheme.

SUBJECT NO. J-19(A)

PADDY AGROMYZID FLY—EXTENSION—HYDERABAD—DECCAN

Southern & Coastal Regional Committee

The Committee recommended the proposal for extension.

Plant Diseases Committee

The Entomologist from Hyderabad explained that the work on paddy Agromyzid fly was carried out only for one year. The extended period of the scheme would cover only the second crop season when the incidence of the fly was low. It was intended to carry on the observation on Ali crop (1st season). The Committee recommended the extension of the scheme up to December, 1957.

K—MYCOLOGY

SUBJECT NO. K-1

SCHEME FOR WORK ON 'BIO-ASSAY' & OTHER TECHNIQUES IN THE STUDY OF PLANT DISEASES—NEW SCHEME—MADRAS UNIVERSITY.

Southern & Coastal Regional Committee

The Committee considered the scheme and felt that this type of the I.C.A.R. should carefully scrutinise this scheme and decide whether this scheme should be sanctioned.

Plant Diseases Committee

The Committee considered the scheme and felt that this type of fundamental work could usefully be done at a University. It was noted that what was intended was, application of certain methods to solving problems relating to the physiology of phytopathogenic fungi, the uptake and mobility of ions in healthy and diseased plants and analysis of rhizosphere soils, but not of development of precision technique. The Committee, subject to these remarks, recommended the scheme. Also it was suggested that only one officer in the scale of a Senior Lecturer should be provided. A sum of Rs. 4,000/- for apparatus and chemicals in the first year and Rs. 1,500/- in each of the subsequent years was considered sufficient. In addition it was recommended that a sum of Rs. 300/- be provided for Travelling purposes.

SUBJECT NO. K-2

RESEARCH ON FUNGICIDES—NEW SCHEME—I.A.R.I.

Northern & Temperate Regional Committee

The Committee was of the view that the work proposed to be undertaken was not clearly defined and should be carried out as the normal activity of the Institute. So far as the production of new fungicides from agricultural waste products was concerned, this work should be entrusted to the N.C.L., Poona. This laboratory was already assisting in the manufacture of insecticides and weedicides.

Plant Diseases Committee

It was agreed that the testing of fungicides, particularly of proprietary compounds, was necessary and required to be taken up under different environmental conditions. It was decided that the scheme should be drawn up in the light of the suggestions by a sub-committee consisting of Dr. P. R. Mehta, Dr. Chottopadhya, Mr. T. S. Ramakrishna Iyer, Dr. Bedi and the Chairman of the Plant Disease Committee and submitted to the I.C.A.R. before the Advisory Board meets.

As far as the development of newer fungicides was concerned, it was suggested that the work be entrusted to National Chemical Laboratory. With a view to putting such important work on sound basis, it was felt that as entomologists were also interested in this type of work as far as the insecticides are concerned, and botanists for weedicides, a committee consisting of mycologists, entomologists, botanists and organic chemists as also a few specialists in medicinal plants be set up to go into this question and draw up a scheme.

SUBJECT NO. K-7

WILT DISEASES OF MAIZE—NEW SCHEME—BIHAR

Eastern Regional Committee

The Committe recommended the scheme.

Plant Diseases Committee

In view of the importance of wilt disease in that area the Committee recommended the scheme for sanction.

SUBJECT NO. K-13

SCHEME FOR THE INVESTIGATION OF RUST AND DOWNY MILDEW DISEASES OF SORGHUM (JOWAR), CUMBU (BAJRA), AND TENAI AND BLAST DISEASES OF RAGI.

Southern and Coastal Regional Committees

The Committee was of the view that the work proposed in this Scheme should normally be taken up in the Co-ordinated Millets Scheme.

Plant Diseases Committee

The scheme was received late. The Committee, however, remarked that these items of work were covered by the Co-ordinated Scheme.

SUBJECT NO. K-14

MAJOR DISEASES OF BARLEY—WEST BENGAL (NEW SCHEME)

Eastern Regional Committee

The Committee did not recommend the scheme because barley was not an important crop in West Bengal, but was of the view that a survey of the diseases of barley might be carried out with a view to determining whether any research was necessary and where this work should be undertaken. The Chairman of the Plant Diseases Committee may be requested to prepare a note on the subject, bringing out the available information on the relative resistance of barley varieties to various diseases.

Plant Diseases Committee

The Committee agreed with the views of the Regional committee that a detailed note on the work so far done on barley should be prepared and co-ordinated scheme drawn up for work on all-India basis.

SUBJECT NO. K-16

ZIRA SCHEME—EXTENSION—RAJASTHAN

The Northern and Temperate Committee noted that the results achieved were not clearly stated and the basis for further work was not given. It, therefore, recommended that the proposal should be recast so that useful results might be obtained during the extension period. Since the disease was caused by a soil-borne fungus, the effective method of control was the evolution of disease-resistant varieties. No indication was given in the proposal about this line of work. The Committee recommended that the scheme should also be placed before the Botany Committee so that it might frame a suitable programme of work for breeding wilt-resistant varieties of cumin.

The *Plant Diseases Committee* recommended extension of the scheme.

The *Botany Committee* agreed with the Regional Committee that the work should now be concentrated on the evolution of disease resistance varieties and the scheme should be suitably revised. The work should also be coordinated with All-India scheme on essential oil yielding plants which is in progress. The Programme of work of the revised scheme may be drawn up in consultation with the Officer-in-charge of the Co-ordinated Scheme on Essential Oil Yielding Plants.

SUBJECT NO. K-18

BLAST DISEASE OF RICE AND FOOT-ROT OF WHEAT—EXTENSION—BOMBAY

Southern & Coastal Regional Committee

The Committee recommended the extension proposal on the usual 50:50 basis with the proviso that the I.C.A.R. should ascertain as to how the work would be done during the extension period.

Plant Diseases Committee

It was felt that as regards the environmental correlation of diseases, the meteorological observations should be made in the experimental field to enable correlation of these factors. It was also suggested that the incidence should be recorded on the neck rot as also on the stem infection of adult plants. The Committee also recommended that the glasshouse should be provided at Poona for carrying out the experiments under controlled conditions. A sum of Rs. 30,000/- as asked for by officer-in-charge of the scheme should be provided. The Committee recommend the extension of the scheme.

Extract from the proceedings of the Agricultural Engineering Committee Meeting held at New Delhi on 19th October, 1956.

L.—AGRICULTURAL IMPLEMENTS

SUBJECT NO. L-1

SCHEME FOR PRODUCTION, DEMONSTRATION TRIAL AND POPULARISATION OF IMPROVED AGRICULTURAL IMPLEMENTS—I.A.R.I. (EXTENSION)

Recommended to continue for two years in the first instance and sanction may be reviewed in due course after seeing the reports received from various States and the utility of implements produced.

M.— ANIMAL BREEDING

(A) CATTLE

SUBJECT NO. M-1

INVESTIGATIONS ON THE PROGENY TESTING OF BULLS UNDER INDIAN CONDITIONS. NEW (CO-ORDINATED) SCHEME. ICAR.

Eastern Regional Committee

(i) The title should be revised to read 'Investigations on progeny testing of bulls under Indian conditions.

(ii) As this was a scheme of national importance, the I.C.A.R. should bear the entire cost.

(iii) Work should be taken up at the following centres : Bombay (Murrah), Hissar (Hariana & Murrah), Haringhata (Hariana & Murrah), Mathura (Hariana and Murrah), Izatnagar (Hariana), Dumraon (Hariana), Visakhapatnam (Murrah).

(iv) The technical scrutiny of the scheme should be done by Animal Breeding Committee.

Southern Regional Committee

This subject was discussed in very great detail in view of its special bearing on the rapid development of cattle in India. The Chairman emphasised that this was a pilot project intended for evolving a quick and practicable method of progeny testing in view of the inherent difficulties of late maturity and low longivity of Indian cattle. The scheme had been prepared jointly by the Statistical Adviser and the Head of the Division of Animal Genetics. It would be seen from the scheme that only as a cooperative venture with various farms taking part, could the special data needed be collected.

The Committee endorsed the recommendations of the Eastern Regional Committee, and added that the Council should bear the cost of only additional staff to be appointed.

Northern & Temperate Regional Committees

The recommendations of the Eastern Regional Committee and Southern Regional Committee were endorsed, with the remark that the work may also be taken up at Anand for the progeny testing schemes in Kankrej breed and at Government Breeding Farm, Basi (Rajasthan) for work on Hariana.

Animal Breeding Committee

The Chairman explained the genesis of the scheme. A long discussion ensued on the desirability of taking up this work in a large number of farms and on a large number of breeds. It was decided that in view of the fact that this is only a pilot scheme for evolving a suitable method for progeny testing of bulls under Indian conditions. it was recommended that a start should be made with Hariana and Kankrej. For Kankrej a separate bull Centre should be located at Anand.

As the different States concerned have not yet sent their schemes, the Committee recommended that the final selection of the centres may be left to Animal Husbandry Commissioner. Before the final selection of the centres. it would be necessary to ensure that the requisite fertilities would be available and essential conditions relating to breeding programme, culling etc. were agreed to by the State Government.

SUBJECT NO. M-2

DETERMINATION OF THE AGE OF MATURITY IN INDIAN BULLS, NEW SCHEME, ORISSA.

Eastern Regional Committee

This scheme was considered last year but was not recommended as it was felt that the proposed investigation was of a local nature. In view, however, of the position as explained by the Director Animal Husbandry & Veterinary Services. Orissa. and the important nature of work it was recommended for further examination by the Animal Breeding Committee, subject to the following remarks :

(1) The title sould be revised to read 'Scheme for determining the age of maturity in Indian bulls ;

(2) Observations should be made on a sufficient number of Hariana bulls, in addition to the two local-breeds, and efforts should be made to obtain material from other States also.

(3) Facilities should be provided for imparting training in this work to officers from other States.

Animal Breeding Committee

Mr. Gurbachan Singh explained that the scheme was being communicated by the Orissa Government.

The scheme was approved with the following modifications :

The furniture should be provided for by the State Government.

In view of the nature of the investigation, it is necessary to provide a peon.

SUBJECT NO. M-3

EVOLUTION OF A NEW BREED OF DAIRY CATTLE BY CROSSING HARIANA COWS WITH JERSEY BULLS, NEW SCHEME, WEST BENGAL.

Eastern Regional Committee

The Scheme was referred to the Cross-breeding Committee.

Cross-breeding Committee

Dr. S. Bhattacharya, Physiological Geneticist, West Bengal, explained the main objective of the scheme and stated that, as was well-known, the Bengal cattle were nondescript and poor producers. The object of the scheme was to evolve a new breed which might be effectively utilised for developing the dairy industry.

The scheme was discussed at great length several members taking part in the discussion.

In reply to a query, the Chairman explained that the cause of deterioration of cattle in heavy rainfall areas was already under investigation under two other Indian Council of Agricultural Research schemes which were running in West Bengal. He was of the view that the limitations imposed by the somewhat unfavourable climate were relatively less important than by poor feeding and management. He also pointed out in reply to another query that in West Bengal the preference was for cow's milk.

Further discussions brought out the following points :—

(a) There was a definite need for the scheme.

(b) Though in some parts of U.S.A. the Jersey was giving place to some other breeds, the Jersey breed continued to occupy an important position in some other countries, because of its special qualities of relatively higher heat tolerance, hardness, smaller size, richer milk. This breed should, therefore, be preferred for the proposed cross-breeding work, even though Holstein or Brown Swiss breeds were higher milk yielders.

(c) Five bulls was the irreducible minimum because the scheme aimed to exploit variability. It would be a distinct advantage if the number of bulls could be doubled or trippled.

With regard to the queries in the Indian Council of Agricultural Research note :—

(1) It was explained by Dr. S. C. Ray that the scheme had already been approved by the State Agricultural Research Committee and would be sent to the Council after approval of the Finance Department had been obtained. That would take some time.

(2) The scheme, as proposed, was in consonance with the decision taken by the Animal Breeding Committee, at its meeting in October, 1955 that the cross breeding of a pure Indian breed for experimental purposes could be permitted outside its home.

(3) The West Bengal representative explained that it would not be possible to make available 100 Hariana cows from the existing herd without upsetting the State Government's programme for distribution of pedigreed bulls.

(4) Breeding would be done by Artificial Insemination.

The following recommendations were adopted in regard to queries 5 to 7.

(i) The minimum number of cows and breeding bulls to be kept under the scheme should be increased to 200 and 10 instead of 100 and 5 respectively as proposed in the scheme. The Committee thought that such increase was necessary to secure sufficient breeding material to select from. But as artificial insemination was to be practised and the entire quantity of semen produced by 10 bulls would not be required for the scheme, the surplus semen could be supplied to other cross-breeding centres of the Indian Council of Agricultural Research.

(ii) The 10 Jersey bulls should be selected for their heat tolerance and milk transmitting qualities and, if necessary, should be procured specially for the scheme. Use must not be made of the bulls already available in the country if these were not absolutely suitable, as it would be false economy to do that.

(iii) The Computor provided for in the scheme was required for the work of compilation of data which would be collected under the scheme. His services were essential and the cost of his salary should be shared equally by the Indian Council of Agricultural Research and the State Government.

(iv) The Lower Division Clerk and two peons, if required, should be provided by the State Government.

(v) The proposed work was of a highly technical nature which would require the services of a Geneticist who combined experience of animal breeding. His initial salary would need to be fixed on the basis of his age and experience in the scale of Rs. 350—1,200, Rs. 650/- being the upper limit.

(vi) The scheme was of a long range type which was likely to involve heavy expenditure. Such expenditure was, however, fully justified by the results expected from it, which would prove useful not only to certain parts of India, but to the whole of sub-tropical world.

(vii) The Government of West Bengal should be asked to submit a revised budget estimate and a clear-cut technical programme in consultation with the Statistical Adviser, Indian Council of Agricultural Research after this scheme was approved by the Indian Council of Agricultural Research.

Animal Breeding Committee

The Committee endorsed the recommendation of the Cross-Breeding Committee.

SUBJECT NO. M-4

CROSS-BREEDING OF CATTLE WITH HOLSTEIN BULLS, NEW SCHEME,—ANDHRA

Southern Regional Committee

Before the consideration of the scheme the Director of Animal Husbandry, Andhra, assured the Committee that the scheme had been approved by Government and would be worked by them if the Council sanctioned the scheme.

The Committee approved the cross breeding scheme subject to scrutiny by the Cross-Breeding and Animal Breeding Committees.

Cross-breeding Committee

The Committee recommended the scheme subject to the following conditions :—

(i) The technical programme should be modified so that it was in accordance with the technical programme of the co-ordinated cross-breeding scheme of the Council.

(ii) Schemes of this kind in operation in other parts of India were based on cross-breeding with Jersey bulls. The Andhra Government, had, however, intended to use Holstein bulls. The Committee did not find any fundamental objection to the latter being done. But since Jersey semen was already available, they thought that the use of Holstein bulls would involve the Indian Council of Agricultural Research in avoidable additional expenditure. If the State Government could provide the Holstein bulls themselves or if arrangements could be made with the Military Dairy Farms to secure semen of Holstein bulls the scheme, as proposed, might be agreed to. Failing that, the State Government might be asked to reconsider their proposal with regard to the use of Holstein bulls.

(iii) From the letter received recently from the State Government, it was not clear as to whether they wanted this scheme to be sanctioned or abandoned. A reference should be made to find out the correct position, before the scheme was actually approved.

Animal Breeding Committee

The Committee endorsed the recommendation of the cross-breeding Committee subject to the modification that Jersey bulls may be tried instead of Holstein Friesien.

SUBJECT NO. M-5

IMPROVEMENT IN MILK PRODUCTION OF INDIGENOUS CATTLE BY CROSS-BREEDING WITH JERSEY—NEW SCHEME—NASIK (BOMBAY)

Northern & Temperate Regional Committees

The Animal Husbandry Commissioner explained the general policy laid down for cross-breeding, and he mentioned that the cost of certain schemes received on this subject, especially from Madras, was found to be very high. It was considered desirbale to undertake this work at centres where necessary facilities in the shape of cattle, buildings etc., were already available. The present scheme was not so costly, but it was necessary to ascertain (i) the type of animal found in the area and (ii) whether it was intended to do cross-breeding with pure Girs, non-descript animals, or graded Girs.

The Scheme was recommended to the Animal Breeding Committee for detailed examination, with the remark that a technical officer of the Council should visit the farm and collect first-hand information about the area, the type of animals available, and the facilities of taking up such work there. It was also recommended that the I.C.A.R. should share the cost in respect of the appointment of a really competent officer to take charge of the scheme.

Cross-breeding Committee

The consideration of the scheme was postponed pending the visit of the Cross-Breeding Committee to the area to study the local conditions and to carry out discussions with the local authorities.

Animal Breeding Committee

The Committee endorsed the recommendation of the Cross-Breeding Committee.

SUBJECT NO. M-6

PURCHASE OF FOUR JERSEY BULLS FOR THE CENTRAL ARTIFICIAL INSEMINATION STATON, BANGALORE—NOTE—I.C.A.R.

Cross-breeding Committee

Shri Kartha explained the scheme and said that the six Jersey bulls, four of which were stationed at Bangalore and two at Haringhata, could not meet the country's expanding requirements under the co-ordinated cross-breeding scheme. It was, therefore, necessary to buy another four Jersey bulls, preferably from Australia, where the price of these bulls was low, as early as possible. The cost was estimated at Rs. 3,000 per bull or Rs. 12,000 for the four. The purchase might be made either through the U.P. Government or through the personal contacts which Dr. Sikka had already established with the head of Government Stud Farms in New South Wales and Queensland.

The proposal was approved.

Animal Breeding Committee

The recommendation of the Cross-Breeding Committee was endorsed.

SUBJECT NO. M-7

THICKNESS OF SKIN AND DISTRIBUTION OF SWEAT GLANDS OF BUFFALOES IN RELATION TO MILK PRODUCTION—NEW SCHEME—IVRI/PUNJAB

Eastern Regional Committee

(i) The scheme is to be worked only at the Indian Veterinary Research Institute for the present.

(ii) At least one popular breed of cattle and one of buffaloes should be studied.

Southern Regional Committee

The Committee endorsed the recommendations of the Eastern Regional Committee that the scheme should be worked at the Indian Veterinary Research Institute and that, at least, one popular breed of cattle and one of buffaloes should be studied.

Northern Temperate Regional Committee

The recommendations of the Eastern Regional Committee and Southern Regional Committee were endorsed, with the remark that technique had been standardised at the Indian Veterinary Research Institute work might be undertaken at other centres.

Animal Breeding Committee

The recommendations of the Eastern Regional Committee that the scheme is to be worked only at the Indian Veterinary Research Institute for the present and that at least one popular breed of cattle and one of buffaloes should be studied was endorsed and the scheme was supported.

The consideration of the Scheme submitted by Punjab may be postponed for the time being.

SUBJECT NO. M-8

POSSIBILITY OF SPREADING OUT THE BREEDING SEASON OF BUFFALOES—NEW SCHEME—INDIAN VETERINARY RESEARCH INSTITUTE

Northern Temperate Regional Committee

In explaining the genesis of the scheme, the Animal Husbandry Commissioner pointed out that the marked tendency towards seasonal calving among buffaloes had become quite a serious problem, specially on the Military farms. Consequently, the Indian Veterinary Research Institute had been requested to prepare a scheme for studying the possibilities of achieving a more or less uniform rate of calving all the year round and clearly ensuring an even supply of milk in the different seasons. The results of this study should prove useful not only to the Military farms but also generally in the country

The scheme was recommended for careful examination of the technical programme and the details of expenditure by the Animal Breeding Committee.

Animal Breeding Committee

The scheme was discussed in details and was recommended.

SUBJECT NO. M-9

COMPARATIVE VALUE OF SELECTIVE BREEDING VERSUS GRADING UP OF UMBLACHERRY CATTLE—NEW SCHEME,—MADRAS

Southern Regional Committee

In the course of discussion a doubt arose whether the Umblacherry was only a type or a definite breed. The Director of Animal Husbandry was however of the view that it was a definite breed. The general feeling therefore was that it would be better to try and improve the breed by selective breeding only. After further discussion it was decided to postpone the consideration of the scheme till a representative of the Indian Council of Agricultural Research had visited the area and studied the breed on the spot.

Animal Breeding Committee

The Committee approved the scheme, in principle, on the lines of other similar schemes, provided the Deputy Livestock Adviser after his visit, states that the place and type are suitable for the work.

SUBJECT NO. M-10

COMPARATIVE VALUE OF GRADING UP WITH SINDHI AND CROSS BREEDING WITH JERSEY—NEW SCHEME—TRAVANCORE-COCHIN

Eastern Regional Committee

The scheme, which was on the lines of similar schemes sanctioned in other States, was recommended for further examination by the Animal Breeding Committee with the remark that a complete plan of breeding and recording of data over a number of years should be laid down.

Animal Breeding Committee

The scheme was supported.

The percentage of culling should be recorded in all such schemes.

SUBJECT NO. M-11

SCHEME TO SUPPLEMENT LIVESTOCK INVESTIGATION—EXTENSION PROPOSALS—PUNJAB

Regional Committees

Not considered

Animal Breeding Committee

The Committee endorsed the recommendation of the Sub-Committee subject to the following.

The post of the Class I Officer may be kept in abeyance for the duration of the extension period, and a Class II Officer appointed instead. The extension may be granted on the distinct understanding from the State Government that on the expiry of the extension period, the scheme will be taken over by the State and work continued.

SUBJECT NO. M-12

INFLUENCE OF THE SYSTEM OF REARING ON SEX BEHAVIOUR OF BREEDING BULLS—MODEL SCHEME—I.C.A.R.

Eastern Regional Committee

The scheme was recommended with the following remarks:

(i) Only two groups of 20 bulls each should be taken. One of these groups will serve as the experimental group and the other as the control group.

(ii) Bulls of both the groups should be trained for service in artificial vagina.

(iii) The practice of tying up should start at the age weaning, whether the animals are atomic birth or at the end of lactation period.

(iv) The procedure for handling and training of bulls and for recording observations about service etc. should be drawn up (by Dr. Bhattacharya and Shri Amble).

(v) Scheme should be called from the following States :— National Dairy Research Institute, Karnal—Sahiwal Punjab—Hissar—Hariana, Madras—Hosur-Sindhi; Mysore —Ajjampur—Amritmahal and Bihar—Patna—Tharparkar.

(vi) As the scheme is of national importance, the entire cost should be borne by the Indian Council of Agricultural Research.

Southern Regional Committee

In endorsing the recommendations of the Eastern Regional Committee, the Southern Regional Committee observed that the Indian Council of Agricultural Research would meet only the additional cost incurred by the farms taking part in the scheme. This additional cost would, of course, be on a 100 per cent basis as the scheme is of national importance.

Northern and Temperate Regional Committee

It was recommended that, in addition to the States from which schemes are to be invited, the Institute of Agriculture, Anand, may also be asked to submit a scheme for work on Kankrej breed.

Animal Breeding Committee

In introducing the scheme the Chairman said that the scheme arose out of suggestion of Prof. Lagerlof, the F.A.O expert on Animal Gynaecology and Obstetrics, that the low serving ability of Indian bulls might be due to the system of rearing of calves. The scheme had been prepared on the basis of the broad outlines suggested by him.

The scheme was discussed in detail and experiences in regard to the handling and degrees of sluggishness in service of bulls in different breeds in different herds were narrated by members.

After prolonged discussion the Committee endorsed the recommendations of the Regional Committees, *i.e.* (a) approved the model scheme (b) Centres should be established at National Dairy Research Institute, Hissar, Hosur, Ajjampur, Anand and Patna.

The Committee decided that attempts at collection of semen should be made from 1½ years' age. The Committee was of the opinion that it was necessary to employ a wholetime officer to co-ordinate the scheme.

SUBJECT NO. M-13

CATTLE STERILITY—EXTENSION TO REMAINING VETERINARY COLLEGES—NEW (CO-ORDINATED) SCHEME—I.C.A.R.

Regional Committees

Not considered by Regional Committees.

Animal Breeding Committee

Approved.

SUBJECT NO. M-14

ESTIMATION OF MILK SUCKED BY CALVES IN UNWEANED HERDS—NEW SCHEME—ANAND

Regional Committees

Not considered.

Animal Breeding Committee

The Committee decided that only one Stockman may be provided. Dr. Patel has brought to the notice of the Committee that the grade for Stockman in Bombay is Rs. 46-130 but the Stockmen who are Matriculates or have two years' agricultural training are entitled to Rs. 55. It is desired to employ such a qualified man for this post. Hence the provision for higher start. Scheme was approved.

SUBJECT NO. M-15

SUPPLY OF PROTECTIVE CLOTHING TO THE STAFF OF THE CENTRAL ARTIFICIAL INSEMINATION STATION, BANGALORE—NOTE—I.C.A.R.

Animal Breeding Committee

The Committee considered the proposal and recommended that protective clothings should be provided for the field workers in the Central Artificial Insemination Stations and in the cross breeding units. The aprons need not necessarily be of plastic. Dosuti aprons may be more convenient in some places.

SUBJECT NO. M-16

STUDY OF THE EFFECT OF CASTRATION OF MALE BUFFALOES AND CATTLE AT DIFFERENT AGES ON THEIR UTILITY FOR DRAUGHT—NEW SCHEME—I.C.A.R.

Regional Committees

Not considered by the Regional Committees.

Animal Breeding Committee

A detailed discussion took place. It was felt that in the absence of a yardstick for measuring the draught capacity of the bullocks such an experiment is not likely to give any valid results. Moreover, as the finding of the study is to be applied in the villages. the Committee suggested that the present scheme may be dropped and the possibility of making similar observation in the Key Villages may be considered.

SUBJECT NO. M-17

PHYSIOLOGY OF THE HUMP, DEWLAP AND SHEATH—NEW SCHEME—WEST BENGAL

Eastern Regional Committee

The scheme was recommended subject to the following remarks :

(i) The studies should include the sheath, besides the hump and dewlap ;

(ii) Work should be confined to anatomical and histological studies, and for this purpose a duration of one year should be sufficient. After these studies have been completed. further work as proposed in the scheme might be undertaken.

(iii) The staff may consist of only one Research Assistant and one Laboratory Attendant ;

(iv) The cost should be shared by the Indian Council of Agricultural Research and the State Government on the usual 50:50 basis.

(v) The scheme should be revised by the State Government on the lines indicated above and it should then be placed before the Scientific Committee concerned.

Animal Breeding Committee

The proposal was approved.

SUBJECT NO. M-18

PROGENY TESTING OF MURRAH BULLS—NEW SCHEME—AAREY MILK COLONY (BOMBAY)

Regional Committees

Not considered by Regional Committees.

Animal Breeding Committee

The scheme was explained by Mr. Kartha, and was discussed at length. It was then approved by the Committee.

SUBJECT NO. M-19

CROSS-BREEDING OF CATTLE IN HILLY AND HEAVY RAINFALL AREAS. PROPOSAL FOR ADDITIONAL STOCKMEN—NOTE—I.C.A.R.

Animal Breeding Committee

Approved.

SUBJECT NO. M-20

EVOLVING SUITABLE DRAUGHT CAPACITY STANDARD FOR BULLOCKS—EXTENSION PROPOSAL—INDIAN VETERINARY RESEARCH INSTITUTE

Regional Committees

Not considered.

Animal Breeding Committee

The Chairman gave a report on the proceedings of the Technical Committee on draught ability which was held at Izatnagar on 10th October, 1956.

After discussion, the Committee endorsed the recommendation of the Technical Committee.

(B) SHEEP AND WOOL

SUBJECT NOS. M-21 AND M-24

WOOL ANALYSIS LABORATORY, BIHAR—EXTENSION PROPOSAL
AND
SHEEP BREEDING RESEARCH STATION, BIHAR—EXTENSION PROPOSAL

Regional Committees

Not considered.

Wool Committee

Both these items pertain to the trial of breeding superior sheep which will produce more and better wool and survive in the existing conditions in Bihar.

Looking into the progress of the work, the Committee felt that the authorities in charge of the scheme have not given adequate attention to provide suitable conditions for raising the experimental flocks and that the changes in the staff have been frequent. The results of breeding to the Gaddi and Romney Marsh breeds have not been encouraging. The work under the scheme should be looked into by the Liaison Officer, (Sheep and Wool), before April next and he should submit a report specifying the steps to be taken for the proper implementation of the breeding programme. The breeding to Cheviets is not envisaged in the scheme and this item should be deleted from the poposal. The Technical Programme of work for the Wool Analysis laboratory should be on the same lines as approvided for similar laboratories.

The Committee recommended the extension of the schemes on the basis of the proposals received for a period of one year *i.e.* from 1st April 1957 to 31st March, 1958.

Animal Breeding Committee

The recommendation of the Wool Committee was endorsed.

SUBJECT NO. M-22

SHEEP AND WOOL IMPROVEMENT SCHEME ON REGIONAL—BASIS—UTTAR PRADESH

Regional Committees

Not considered.

Wool Committee

The details of the work carried out at the Regional Sheep Breeding Station established in Uttar Pradesh were explained by the Chairman and the Committee was apprised of the present position of experimental breeding of sheep.

It was considered that the maintenance of Rambouillet sheep and its cross-bred progeny at the Research Station was extremely satisfactory and that the work should continue on the lines of the technical programme approved by the Council for a further period of three years.

The details as regards the additional requiremnts proposed during the extension period were looked into by the Committee and the following recommendations were made.

1. *Staff at the Research Station*

(a) It is essential to provide for one Research Assistant to help the Officer Incharge of the scheme as included in the proposal.

(b) The State Government may provide for the Accounts Clerk as the Council generally does not share the expenditure on the clerical staff. The post of one clerk sanctioned in the original scheme may be retained.

(c) The provision of the two stockmen in the extension proposal may be accepted as the research programme will increase during the extension period.

(d) It was considered essential to provide the Officer Incharge with a peon as the farm is located in an out-of-way place and the rearing of the flocks is carried out at two places, one as a winter resort and another as a summer resort ; the latter is located at altitudes ranging from 11 to 12 thousand feet. The Officer has to maintain a contact for the daily work at these places and for obtaining essential material to carry out the rouine office work. Hence as a special case, the Committee considered that one peon should be provided. The additional peon for the Research Assistant may not be accepted.

(e) The proposal as regards the appointment of a Jamadar and other class IV servants was considered necessary due to the expanded activities of the farm and due to the peculiar situation of the experimental station in the high altitudes away from human habitate.

2. *Staff at the Wool Analysis Laboratory*

The Committee considered that the volume of work at the Wool Research Laboratory has not expanded to the extent expected and that the staff sanctioned in the original scheme may only be retained. The additional requirements as asked for is not considered essential at the present stage.

3. *Allowance for the staff*

Travelling allowances for the staff may be restricted to Rs. 1,000 for the present. The Committee was of the opinion that there is no reason to increase the allotment under this head.

The rate of payment of fixed travelling allowance to Stockmen should be on the basis of the scale approved by the Uttar Pradesh Government for the personnel working in the Hills. In view of the special conditions prevailing at the remote places where the sheep breeding research station is established, it was considered essential to allot the special pay to the Class IV servants as proposed in the scheme.

4. *Contingencies for the farm*

The item pertaining to the books and periodicals may be provided by the State Government. The allotment under postage and stationery may be reduced to Rs. 600 or Rs. 200 per year for a period of three years instead of Rs. 2,400.

Contingencies—Wool Research Laboratory

It was considered that an amount of Rs. 1,000 for the chemicals, apparatus and miscellaneous should be provided instead of Rs. 200 a year.

The item for the purchase of sheep at a cost of Rs. 6,400 may be retained.

It is, however, essential to point out to the State Government that the additional flock should not be obtained unless the requisite facilities are provided on the farm to house the experimental flocks and to provide other facilities for grazing and growing of fodder crops.

An amount of Rs. 1,000 may be accepted for providing furniture essential for the Research Station. The cost on items pertaining to typewriter etc. may be met by the State Government.

The Committee recommended the proposal for extension subject to the suggestions made above.

Animal Breeding Committee

The recommendations of the Committee were endorsed and the proposal for extension of the scheme recommended for approval.

SUBJECT NO. M-23

SHEEP AND WOOL IMPROVEMENT SCHEME ON REGIONAL BASIS—BOMBAY—EXTENSION PROPOSAL

Regional Committees

Not considered.

Wool Committee

The proposal for the extension for a period of five years of the scheme on the regional basis now in operation in the Bombay State was considered by the Committee in detail and it was considered essential to point out that the experimental breeding work envisaged during the extension period will not be of the magnitude accepted by the Council in sanctioning the original scheme. After the initial progress in cross-breeding it was necessary to expand the diffeernt lines of experimental breeding to obtain concrete results. The present proposal is more or less to continue the existing work without the appropriate expansion of the breeding programme. At present a number of breeding lines are maintained with few sheep to study the performance from one generation to another. This method of raising few sheep to study the inheritance will not bring about the desired combination of characters for evolving new strains. This station has caried out pioneering work in research in sheep improvement but if any tangible results are to be obtained for promoting sheep improvement programme it is essential to expand the present activities so that each line of the experimental flock will constitute at least a flock of 250 ewes. When Bombay State is reorganised it will have the second place as regards wool production in India and hence the Council was doubtful whether the restricted programme envisaged in the extension proposal would substantially contribute to the development of Sheep and Wool Industry.

With these observations the Committee accepted the proposal for the extension. Slight increase in the requirements under the contingencies and staff were considered as essential.

Animal Breeding Committee

The extension proposal was recommended. The Committee also considered the items of expenditure and felt that in view of the proposed expansion in the technical programme of the work, the additional items of expenditure would be necessary. According to the recent decision of the Bombay Government, their employees were entitled to the 'compensatory local allowance' and hence the retention of this item was considered necessary. (Item 3 of Appendix II).

SUBJECT NO. M-25

WOOL UTILISATION CENTRE—NEW SCHEME—MADRAS

Regional Committee

Mr. Khot explained the main features of the scheme and said that it was on the lines of the ICAR circular, according to which a centre had already been established in U.P. The Committee supported the proposal subject to examination of details by the Wool Committee.

A question was raised as to why this centre would be located in Coimbatore whereas the regional station for sheep and wool was in Ootacamund. It was explained that very few people would go to Ootacamund and have the benefit of seeing the utilisation work, hence its location in Coimbatore.

Wool Committee

The Chairman explained that the Council has recommended that in establishing the Regional Research Stations it is essential to attach a Wool Utilisation Centre so that the new classes of wools produced by the experimental flocks can be processed to study the utility. In the scheme, which is placed for the consideration of the Committee, the items proposed are on the lines approved in the original Sheep Breeding Research plans sponsored by the Council.

The Committee recommended the sanction of the Wool Utilisation Centre scheme as proposed by the authorities of the Government of Madras State

SUBJECT NO. M-26

SKIN STUDIES OF SHEEP—MODEL SCHEME—I.C.A.R.

Southern Regional Committee

In the course of discussion it was pointed out that the scheme was really an extension of the programme adopted for Regional Wool Testing Laboratories. The Committee recommended that it should be taken up by the existing Regional Wool Testing Laboratories and that such additional staff, equipment and training, as required, should be sanctioned.

Northern and Temperate Regional Committees

The Animal Husbandry Commissioner explained the objects of the scheme and said that the results of this scheme should enable us to make a selection of good quality sheep at a reasonably early age.

The scheme was recommended for examination by the Wool Committee.

Wool Committee

The Chairman explained that the Wool Committee at its meeting held in April, 1956 recommended that the study of skins should form a routine work at the principal Sheep Breeding Research Stations in India and hence a model scheme is placed for consideration.

It was suggested that the requirements for the apparatus and equipment should be scrutinized by Mrs. Narayan, Officer Incharge of the Wool Analysis Laboratory, Rajasthan, as she has recently received training in the subject.

The model scheme was accepted by the Committee and it was recommended that the work should be undertaken at the Wool Research Laboratories attached to the Regional Sheep Breeding Stations in Rajasthan, Bombay and U.P.

Animal Breeding Committee

The Committee endorsed the recommendation of the Wool Committee subject to the suggestion that the post of one Laboratory Assistant only may be sanctioned instead of two.

SUBJECT NO. M-27

DEVELOPING MUTTON BREEDS OF SHEEP—NEW SCHEME—CHINGLEPUT, MADRAS

Southern Regional Committee

Not considered.

Wool Committee

Item No. 9 : Developing Mutton Breeds of Sheep—Madras

The proposal received from the Govermnent of Madras State to undertake an experimental breeding programme for evolving mutton breeds of sheep was considered. The Chairman explained that a model plan was accepted by the Council sometime back and the States of Madras, Bombay and Mysore were approached to cooperate in undertaking a co-ordinated research programme on the subject. The present scheme is drafted on the same lines and may be recommended.

The Committee in recommending the scheme was of the opinion that the details of the Technical programme should be scrutinised by the Animal Breeding Committee.

Animal Breeding Committee

After considering the recommendations of Wool Committee, the acceptance of the scheme, was approved in principle. (Item 9 of Appendix II).

The Committee was of the opinion, that this scheme should fall in line with the model scheme. Further discussion revealed that the technical programme of the model scheme required scrutiny. This should be done by a Sub-Committee consisting of :—

(1) Animal Husbandry Commissioner
(2) Dr. P. Bhattacharya
(3) Mr. Khot
(4) Mr. Amble

so that the Technical Programme can be followed in operating similar schemes.

SUBJECT NO. M-28

RESEARCH UNITS FOR STUDY OF SHEEP PRODUCTION IN A MIXED FARMING ECONOMY—MODEL SCHEME—I.C.A.R.

Eastern Regional Committee

1. The title of the scheme should be revised to read 'Scheme for the development of a type of sheep suitable for mixed farming conditions,

2. Scheme should be called for from Bombay, Rajasthan, U.P., Punjab and Madras States.

3. A detailed technical programme will have to be prepared on the different aspects of the scheme including breeding and feeding, and this should be examined by the Animal Breeding Committee.

Southern Regional Committee

As desired by Chairman, Mr. Khot explained the scheme in detail and said that its main objective was to evolve and develop a type of sheep which would fit into the present conditions. After further discussion it was pointed out that some of the breeds of sheep in Southern India generally fitted into these conditions and could be used straightaway. In course of discussion, it was also pointed out that the changed conditions brought in by the extension of irrigation facilities demanded new types of sheep which would fit into the changed conditions.

After further discussion, the Committee endorsed the recommendations of the Eastern Regional Committee but added that :—

(a) the scheme should be in two parts. In the South, where facilities existed, the existing breeds should be tried while in other places a new type should be evolved which would fit in the existing conditions ;

(b) Mysore and Andhra should be included in addition to Bombay, Rajasthan, U.P., Punjab, Madras, etc., as already suggested by the Eastern Regional Committee.

Wool Committee

The Chairman explained that the Wool Committee at its meeting held in April 1956, recommended that research in evolving new sheep suited to a mixed farming economy should be undertaken in the country. A model scheme was submitted for consideration of the Committee.

The members were of the opinion that this work was of fundamental importance in the development of sheep industry on a new basis and it was not advisable to locate the work in a number of places in the country. To begin with, the programme under the scheme may be undertaken in the States where sheep rearing is popular among farmers, particularly in the Southern Region.

Animal Breeding Committee

The Committee had a detailed discussion on the objectives of the scheme and considered this subject to be of great importance in the Sheep and Wool development in the country. However, in its present form, the objectives laid down in the scheme were very broad and it was considered necessary to narrow these down. It was also desirable to draw up a detailed technical programmee to suit the changes to be made in the objectives of the scheme. The Committee suggested that the scheme may be re-submitted for consideration next year after the same is revised by a Sub-Committee consisting of :—

(1) Animal Husbandry Commissioner

(2) Mr. Khot

(3) Dr. P. Bhattacharya.

(4) Mr. Amble.

(5) Shri Gurbux Singh Mahal.

(6) Dr. R. B. Singh.

The Sub-Committee should also suggest the names of States where the scheme should be taken up.

(C) GOAT

SUBJECT NO. M-29

EXPLORING THE POSSIBILITIES OF MOHAIR PRODUCTION—NEW SCHEME—ANDHRA

Southern Regional Committee

In introducing the subject, the Chairman briefly reviewed the results of work already done during the last several years on the evolution of local type of Angora goat for the development of mohair industry. The scheme was first worked in Hissar but the conditions of Hissar did not suit the animals. They lost size and there was reduction in milk yield also. The scheme was then shifted to Pipalkoti, U.P. where also the animals did not appear to do well.

He invited Mr. Khot to give the results of his recent visit to Pipalkoti. In the opinion of Mr. Khot, the Angoras did well. He felt that the reduction in size had not been properly studied. The local goat *viz*., the Chamba, with which the Angoras were crossed, is a heavy animal used for the carrying of loads up the hills, whereas the Angora is an animal intended for the production of mohair and meat. The two characters do not seem to be compatible. In his experience of Poona, he found that the size was not going down. The mortality was low but the number of kids born was only one per year. He also found that under Poona and Dharwar conditions, the milk yield was more than that of the local. But in the Bombay scheme, the milking of animals had been banned, because the animals already were yielding about 5 lb. of mohair and the development of milking capacity would be too severe a strain on their constitution.

Mr. Khot felt that the conditions in Dharwar (about 1,800 feet above sea level) were similar to those in the Andhra area where the scheme is proposed to be located. He felt, therefore, that the area would be quite suitable and the work was likely to bear satisfactory results. He added that the meat of the Angora goat was very tasty and was in great demand.

The Chairman explained that he had measurements obtained from South Africa. When compared with measuremetns, the size of our cross-breed animals now in U.P. and Punjab Scheme were much lower in bone, weight, length of body etc. Secondly, with the infusion of more of Angora blood, the milk yield had decreased to an extent that it was difficult for the dams to rear their kids. The milk yield was intended not for human consumption but for feeding the kids. Further, he observed that in the U.P. scheme there was a decrease in the production of mohair also in higher grades.

Mr. Khot pointed out that in the second and third generations, first class mohair had been produced and this hair fetched about Rs. 3 per pound and was, therefore, paying. All this hair was used for the manufacture of blankets which fetched a lucrative price.

After further discussion, the Committee felt that the scheme was on lines similar to the one working in Bombay and that it should be accepted subject to scrutiny of details by the Animal Breeding and Wool Committees.

Wool Committee

The Chairman explained the present position of the experimental breeding of Angora goats undertaken under the auspices of the Council. The proposal received from the Government of Andhra envisages the trial of pure-breed Angora and its cross-breed progeny at the Government Livestock Farm, Palmaner in Andhra State. Site is reported as suitable for undertaking experimental breeding.

It was recommend that—

(a) that the number of Angora goats to be imported should be restricted to eight bucks and 12 nannies instead of 4 bucks and 24 does ;

(b) the heard of the local goats should be increased from 24 as proposed to 160 to obtain tangible results ;

(c) Shri Khot should visit this Station at the earliest opportunity and ascertain the suitability of the places for undertaking the experiment.

Scheme is recommended for the acceptance of the Council subject to the suggestions made above.

Animal Breeding Committee

The recommendations of the Wool Committee to accept the scheme was endorsed.

Lt. Col. Murari informed the Committee that the scheme has been accepted by the Government of Andhra and a communication to that effect will soon be received by the Council.

The cost on purchase of the foundation stock may be shared by the Indian Council of Agricultural Research and the State on 50:50 basis.

The details of expenditure pertaining to the purchase of foundation herd may be called for from the State Government and approved by the Animal Husbandry Commissioner.

The peon, if considered necessary, may be provided by the State Government.

The receipts should be shared on 50:50 basis between the I.C.A.R. and the State Government.

SUBJECT NO. M-30

INDIGENOUS GOAT BREEDING SCHEME—EXTENSION PROPOSAL—HISSAR (PUNJAB)

Animal Breeding Committee

The Committee felt that the stage had reached when the State Government should take over the continuance of the scheme. However, in view of the difficulties explained by Mr. M. L. Kohli regarding the transfer of the scheme immediately, to the Punjab Government, the Committee recommended that the scheme may be extended on the existing basis for a period of two years on the distinct understanding from the State Government that the scheme will be taken over and the work continued by them after the expiry of this period.

(D.) POULTRY AND DUCK

SUBJECT NO. M-31

DEFERTILISATION OF EGGS—FOLLOW UP WORK—NEW SCHEME—I.V.R.I.

Eastern Regional Committee

The scheme was recommended for consideration by the Poultry Committee and the Animal Breeding Committee.

Northern Regional Committee

The discussion on this scheme emphasized the desirability of including duck eggs in the study and using such packing materials as were easily available locally and were cheap enough to be economically exploited commercially.

The recommendation of the Eastern Regional Committee was endorsed with the remarks that the scheme should include similar work on duck eggs and that cheap and easily available packing materials should be used.

Poultry Committee

The Chairman introduced the subject by explaining the main subject of the Scheme. After discussion at length the Committee recommended the shceme with the following remarks :—

(1) A Class II Officer may be provided in place of Senior Grade Research Assistant in view of highly specialised nature of the work.

(2) Under contingencies to provide for duck eggs also, the amount be increased to Rs. 1,500.

(3) Under Travelling Allowance the amount should be reduced to Rs. 1,000.

(4) The eggs will be sent in bamboo baskets for uniformity and the Committee did not recommend the use of costly wooden packing cases.

(5) Experiments on improved methods of packing and tests on the eggs processed, should form two different issues.

(6) The duration of the Scheme should be at least 12 months in view of the varying climatic conditions in the different parts of the country.

Animal Breeding Committee

Mr. Iyer explained the details of the scheme and the recommendations made by the Poultry Committee. After discussion the Committee endorsed the recommendations of the Poultry Committee. (Item 1 of Appendix III).

The amount provided in Contingencies is meant for expenditure on account of freight and packages and as recommended by the Poultry Committee it may be increased to Rs. 1,500.

SUBJECT NO. M-32

STUDIES ON THE GROWTH RATE AND EGG PRODUCTION OF PURE-BREED VERSUS CROSS-BREED POULTRY WHEN FED ON TWO DIFFERENT DIETS—NEW SCHEME—WEST BENGAL

Eastern Regional Committee

The scheme was recommended for further examination by the Poultry Committee and the Animal Breeding Committee, and it was suggested that the detailed technical programme should be drawn up for consideration by these committees.

Poultry Committee

In the absence of a detailed technical programme the Committee was unable to scrutinize the different items of work proposed to be taken up. After examining the scheme in its present form the Committee recommended the scheme with the following remarks :—

(1) The non-recurring expenditure as usual should be the responsibility of the State Government.

(2) The receipts may be shared by the Council on 50:50 basis. In the plan of work maintenance of three breeds had been suggested. The Committee felt that Barred Plymouth Rock breed might be deleted in view of the unattractive size of the egg and the difficulties that might be experienced as a result of dominance of barring in the successive generations of breeding.

(3) The egg production for the poultry year was alright but collection of data for the second year should be deleted as it is an established fact that the egg production in the first year is usually followed by good egg production in the second and third years.

(4) The share of the Council as regards funds should be calculated taking no account of the receipts.

(5) The post of one computor may be deleted and in its place one post of laboratory assistant-*cum*-clerk on the usual scale of the Council say 60—150 may be provided. Provision seems to have been made under recurring expenditure only for unit posts in the case of laboratory attendant and poultry attendants. The total amount should, therefore, be multiplied by the number of personnel provided. As one breed has been deleted, under recurring expenditure the other items may be amended accordingly. For instance the total number of poultry attendants 6 may reduced to four.

The scheme, therefore, should be returned to the State for necessary modification.

Animal Breeding Committee

Dr. S. Bhattacharya (West Bengal) explained that the scheme had been approved by the State Agricultural Research Committee and was perhaps on its way from the Government of Bengal. He also gave a brief outline of the Technical Programme. Mr. Iyer explained the decisions arrived at by the Poultry Committee (Item 2 of Appendix III).

The Committee was of the opinion that the cost of foundation stock should be shared as in other schemes.

The scheme was approved.

SUBJECT NO. M-33

CORRELATION BETWEEN PHYSICAL BODY CHARACTERISTICS AND EGG PROTION—NEW SCHEME—I.V.R.I.

Northern Regional Committee

Dr. Bose referred to the common practice followed in many countries of judging the egg-laying capacity by some physical characteristics. He was confident that in this country also it should be possible to find out some such method for judging the egg-laying capactiy. He agreed to modify the scoring method as suggested by the Statistician, but he was of the opinion that 50 W.L. and 50 R.I.R. would be enough for the purpose. In view of the facts that W. L. and R.I.R. were the two most popular breeds it was considered desirable to include both breeds for examination in this work.

This scheme, which did not involve any regional significance, was recommended for further examination by the Poultry Committee.

Poultry Committee

The Committee examined the scheme in detail and was in agreement with all the suggestions made by the Statistical Adviser. This subject elicited very interesting discussion and the three American Experts who attended the meeting took part in the discussions and stressed the immediate need for undertaking work of this nature.

The Committee recommended the scheme with the following remarks :

(1) One Class II in place of Class I Officer. Instead of one Research Assistant the Committee was of the opinion that one post of laboratory Assistant-*cum*-clerk in the scale of Rs. 60-150 should be provided. The financial statement of accounts of the scheme, should, therefore, be amended accordingly.

(2) Biochemical analysis of suitable materials should also be incoporated in the plan of work where necessary.

Animal Breeding Committee

Mr. Iyer introduced the scheme and explained the recommendations made by the Poultry Committee. A detailed discussion took place in which many members took part (Item 4 of Appendix III).

The Committee felt that such a study would be of aid in judging of birds at the poultry show and, as such they recommended the adoption of the scheme. In the title of the scheme the word physical may be changed to "Physiological and".

SUBJECT NO. M-34

ECONOMICS OF POULTRY KEEPING—NEW SCHEME—AGRICULTURAL INSTITUTE, KATPADI

Southern Regional Committee

This scheme was discussed at very great length because of the importance of getting accurate information on the economics of poultry keeping and egg production. Certain data which had been received tended to indicate that commercial egg production was not very profitable unless the organization was able to sell a certain percentage of the eggs as hatching eggs. The Committee were convinced of the importance of obtaining precise information regarding the cost of production but, at the same time, they were conscious of the complicated nature of the undertaking. In the case of poultry birds are kept under varying coditions in varying sizes of flocks and it was necessary to conduct a survey on a wide scale under all kinds of conditions and to analyse and interpret the data in the best possible manner. After further discussion, the Committee made the following recommendations.

A study of the economics of egg production was extremely essential. As it was complicated, the scheme required very careful planning. They were however, against having a separate scheme as now submitted. The best way would be to prepare a model plan in consultation with the Statistical Adviser to the Council, according to which data may be collected from Government farms, private farms and individual poultry keepers all over the country. The data should then be studied by the Animal Husbandry Statistician.

Poultry Committee

The Committee endorsed the recommednations of the Regional Committee and suggested the following items to enable the Statistical adviser to prepare model plans:

(a) Cost of production a lb. of egg.
(b) Cost of producing a lb. of live chicken.
(c) Food consumption data in different classes of chickens.
(d) Mortality data and replacement costs.

The Committee was of the opinion that the cost of production studies were most important as adequate information was not available. The Committee observed that the collection of data should not be restricted to any special units or groups but should be extended to on a plan prescribed by the Statistician to enable launching of model pilot projects on the lines of costing of milk production studies.

The Committee was also of the opinion that for general information, a standard proforma should be available for circulation to the different Government farms who might prepare balance-sheet annually. The Committee, however, emphasized that collection of data might be restricted to two of the popular breeds—White Leghorn and Rhode Island Red. The consideration of the scheme in question may, therefore, be kept in abeyance.

Ad hoc Milk Costing Committee

Subject 12

The Committee recognised the importance of the scheme but considered it premature at present. It endorsed the recommendations of the Southern Regional Committee (A.H.)

Animal Breeding Committee

The views expressed by the Poultry Committee were endorsed. The scheme was not recommended. (Item 5 of Appendix III).

The Committee further recommended that the suggestions (a), (b), (c) and (d) of the Poultry Committee under this item may be followed in all the poultry scheme.

SUBJECT NO. M-35

STUDYING THE INFLUENCE OF CLIMATE ON THE PERFORMANCE OF IMPROVED DESI FOWLS—EXTENSION PROPOSAL—ORISSA

Poultry Committee

The Chairman explained in detail the origin and functioning of the scheme. The Committee endorsed the remarks of the Animal Husbandry Commissioner and suggested that Orissa should be allowed to continue the work on hand for the duration of the scheme as originally sanctioned. The proposals for the extension of the scheme should be considered after the examination of the final progress report by the Statistical Adviser. The receipts may be adjusted in the ratio in which expenditure is shared. Before the submission of the progress report the Committee felt that the Statistician should be consulted.

Animal Breeding Committee

The above two items were considered together. A detailed discussion took place in which many members took part. It was pointed out that since the objetcive of the scheme was to study the performance of improved Desi strain of fowls, evolved at the Indian Veterinary Research Institute, under different soil and climatic conditions, it would not be proper to judge the suitability or otherwise of these birds on the basis of the information obtained from a single experiment carried out in one solitary station. The committee recommended that though the Orissa scheme should be allowed to continue for the duration of the sanctioned period, starting of the other similar schemes, already sanctioned should be kept in abeyance till the results from the Orissa scheme had been thoroughly studied. (Item 7 and 12 of Appendix III).

SUBJECT NO. M-36

SCHEME FOR LAYING TRIALS OF EGGS—EXTENSION PROPOSAL—I.V.R.I.

Poultry Committee

The Committee examined the results of the first laying trials at the I.V.R.I. and felt that the number of entries should have been at least 25. The Chairman explained the working of the scheme in detail and stated the various difficulties experienced by him, in the maintenance of the birds. The mortality in the case of some of the entries was very high and in most of the cases the cause of death was reritonitis. That Leucosis might have been one of the factors responsible for the loss was the opinion of the Committee. After discussion the Committee recommended the scheme with the following remarks :—

(1) Adequate funds should be provided by the I.C.A.R. in the extension scheme for the construction or purely temporary runs and poultry houses, the work being of national importance.

(2) These States who have the requisite facilities to initiate work of this nature should be encouraged to do so but the scheme should be remodelled on the lines of the model scheme for comparing the performance of different strains of poultry by applying random sample test preferably in the four regional stations of the All India Poultry Development Scheme with co-ordination from the I.V.R.I. The I.V.R.I. should not initiate further work without the staff and the houses.

(3) The Committee also suggested that in view of the importance of giving adequate notice to the breeders well in advance the Council as proposed in their note might sanction starting of the work at the I.V.R.I. from January or February, 1957.

Animal Breeding Committee

The extension of the scheme was recommended.

Recommendation No. 2 of the Poultry Committee may be brought to the notice of the authorities of the I.V.R.I. (Item 8 of Appendix III).

SUBJECT NO. M-37

CHICK HATCHERY PROCESSING PLAN—KATPADI—ADDITIONAL FUNDS—NOTE—I.C.A.R.

Poultry Committee

The Committee was informed that the Agriculture Institute had come up to the Council with application for supplementary grants. The Committee examined the request and felt that the sum of Rs. 21.000 should be provided immediately. as work had started, to provide the necessary accommodation for the large number of chicken produced.

Animal Breeding Committee

The recommendations of the Poultry Committee were endorsed (Item 6 of Appendix III).

(E.) OTHER LIVESTOCKS

SUBJECT NO. M-38

PRODUCTION OF STERILITY IN INDIAN MONKEYS BY DRUG THERAPY

Eastern Regional Committee

No special regional significance was involved in this scheme, which would be examined by the Scientific Committee (Animal Breeding and Medicinal Plants Committees). The author of the scheme should be asked to attend the Scientific Committee to explain this scheme.

Southern Regional Committee

The recommendation of the Eastern Regional Committee was endorsed.

Northern Regional Committee

The recommendations of the Eastern Regional Committee and the Southern Regional Committee were endorsed.

Medicinal Plants Committee

Proceedings not ready.

Animal Breeding Committee

Dr. A. B. Kar of the Central Drug Research Institute explained the main features of the scheme which was then discussed in detail. Several members took part. The Committee felt that the present objective of the scheme was not related to animal breeding. The Committee was of the opinion that fundamental researches to find out methods of inducing sterility in animals was of great importance. As the results obtained from such fundamental work may lead to application in larger animals, the Committee approved the scheme, in principle, with the recommendation that both the title and the objective of the scheme may be suitably modified, so that it may have a bearing on the animal husbandry work.

The post of the Senior Scientific Assistant may be deleted. The higher initial pay for the Senior Scientific Officer may not be specifically mentioned, and that the work should embrace other laboratory animals.

SUBJECT NO. M-39

ESTABLISHMENT OF A CAMEL FARM FOR THE BIKANERI BREED AND OPENING OF 10 KEY VILLAGE CENTRES FOR THE IMPROVEMENT OF CAMELS IN RAJASTHAN—NEW SCHEME—I.C.A.R.

Regional Committees

Not considered.

Animal Breeding Committee

The scheme should be financed by the I.C.A.R. and Rajasthan State on the usual 50:50 basis specially because the results accruing from this scheme would primarily benefit Rajasthan State.

SUBJECT NO. M-40

DIPLOMA COURSE IN SWINE HUSBANDRY AND PORK PRODUCTION—NEW SCHEME—UTTAR PRADESH

Regional Committee

Not considered.

Animal Breeding Committee

Mr. P. G. Pande explained the scheme and said that the scheme had been submitted to the U.P. Government and had been approved by them. The syllabus was handed over to the members at the meeting. The Committee decided that in view of the special nature of the work, peon, chowkidar and other staff should be provided. The scheme was approved.

SUBJECT NO. M-41

EVOLVING A NEW TYPE OF PIGS BY CROSS-BREEDING—NEW SCHEME—UTTAR PRADESH

Regional Committee

Not considered.

Animal Breeding Committee

Mr. P. G. Pande introduced the scheme. The scheme was approvided after discussion subject to the following remarks :—

The boars should be Middle White Yorkshire. The sows should be local pure-bred. The Technical Programme will be resubmitted after the appointment of the Officer and in consultation with the Animal Husbandry Statistician and the Head of the Division of Genetics, I.V.R.I.

Peon and Chowkidar should be provided by the State Government, if considered necessary.

Regarding (6), the Committee agreed to it.

The Committee was strongly of the opinion that highly qualified Animal Geneticist should be appointed incharge of the scheme.

N—ANIMAL NUTRITION

SUBJECT NO. N-1

INVESTIGATION INTO THE CAUSES OF DELAYED MATURITY OF CATTLE UNDER VILLAGE CONDITIONS AND THE EFFECT ON REPRODUCTION—MODEL SCHEME—VARIOUS STATES

Regional Committees

Not considered.

Animal Nutrition and Animal Breeding Committees (Joint meeting)

The Chairman explained the genesis of the scheme and detailed discussion followed. The Committee recommended that a comprehensive scheme should be taken up embracing all aspects which may contribute to delayed maturity.

However, the scheme, in its present form may be approved for one year. In the meantime, a Sub-Committee may be formed to prepare a comprehensive scheme.

The Sub-Committee may consist of :—

(1) Dr. Kaura.
(2) Dr. P. Bhattacharya.
(3) Dr. Kehar.
(4) Dr. Patel.
(5) Shri G. B. Singh.
(6) Shri R. B. Singh.
(7) Mr. Amble.

SUBJECT NO. N-2

DETERMINATION OF ECONOMIC POULTRY RATIONS, NEW SCHEME—ANDHRA/MADRAS/PUNJAB

Eastern Regional Committee

This scheme was recommended, pending examination of the technical details, provision of staff etc., by the Poultry Committee and the Animal Breeding Committee. It was suggested that the work relating to fundamental studies should be undertaken at the I.V.R.I.

Southern Regional Committee

In the course of discussion it was pointed out that the scheme was partly of a fundamental nature and partly applied. Dr. Panse pointed out that the purpose might be served by a detailed survey of feeding stuffs and of their chemical composition and feeding value and their prices in the market. From that information it should be possible to compute a suitable economic ration.

After further discussion it was decided that :—

(a) the scheme should be discussed in detail at a combined meeting of the Animal Nutrition and Poultry Committees,

(b) meanwhile, Mr. Iyer should prepare a comprehensive note on the subject in the light of the discussions at this Committee,

(c) the scheme should be examined by the Statistician in order to ensure that the results obtained would be valid and conclusive.

Northern and Temperate Regional Committee (Joint meeting).

As desired by the Southern Regional Committee, a note on this subject prepared by Dr. Bose was circulated to the members. Dr. Bose also mentioned the more important nutritional studies on chickens and growing birds carried out at Izatnagar and further pointed out that the biological value of a large number of feeds under northern Indian conditions had already been investigated.

It was pointed out that the object of the scheme was two-fold, (i) to formulate economic poultry rations from locally available poultry feeds in different regions of the country and (ii) determination of biological value of the experimental rations by the balance-sheet method at I.V.R.I. It was recommended that the scheme might be examined by the Poultry and Animal Nutrition Committees in the light of the recommendations made by the regional committees.

Poultry Committee

After considerable discussion the Committee accepted the model scheme as well as the schemes as received from States subject to the following remarks :—

(1) The duration of the Scheme in all cases should be 3 years in the first instance.

(2) The cost of the different commodities and rations computed therefrom should be precisely examined instead of confining the experimental work in the field to only one experimental ration, at least 3 or 4 experimental rations should be formulated, and tested, if possible, so that at the end of the experiments there would be a substantial reduction in the case of cost of production at least in one type of ration. The results obtained from the Council Scheme on poultry research in Madhya Pradesh should also be incorporated in the preparation of experimental rations.

(3) The proposed test on breeding stock should be kept in abeyance and attention concentrated on growth rate and pullet year production. The duration of the test may be restricted to 48 weeks in the case of laying rations and 8 weeks in the case of growth rate studies.

In view of the important nature of the above recommendations the Committee suggested that a sub-committee consisting of Dr. S. Bose, Sardar Harbhajan Singh, Shri T. R. Puri, Shri J. N. Panda (Orissa) should review the plan of work in the light of economy and efficiency of performances and submit a detailed report to the Council. In the meanwhile, however, subject to sanction by the Council, Punjab, Madras and Andhra may be requested to start work in consultation with the Division of Poultry Research, Indian Veterinary Research Institute, Izatnagar, in respect of computing rations from locally available commodities. It is hoped that Officer-in-charge of the Scheme will regularly get the samples of experimental rations analysed by Poultry Research Division, Indian Veterinary Research Institute, Izatnagar. Summarising, the Committee endorsed the recommendations of the Regional Committees and agreed that fundamental work should be the responsibility of the Central Institute.

Animal Nutrition and Animal Breeding Committees (Joint meeting)

Mr. Iyer explained the scheme in details and after discussion the Committee endorsed the views of the regional committees and approved the scheme.

SUBJECT NO. N-3

SCHEME FOR INVESTIGATION OF THE TOXIC PLANTS AND HERBS LETHAL TO DOMESTIC ANIMALS—REVISED SCHEME—WEST BENGAL

Regional Committees

Not considered.

Animal Nutrition Committee

The Committee approved of the technical programme and suggested that :—

(a) a comprehensive list of the toxic plants be prepared by the Officer-in-charge. This list should be finalised by the Head of the Division of Animal Nutrition, Indian Veterinary Research Institute, in consultation with Col. R. N. Chopra, Director, Drug Research Institute, Jammu;

(b) the Assistant Research Officer should be a Biochemist ; and

(c) Item 2, under A-Establishment should be read as Research Assistant, who should be a Veterinary Graduate.

SUBJECT NO. N-4

INVESTIGATIONS ON THE NUTRITIONAL REQUIREMENTS OF GOATS IN ORISSA—NEW SCHEME—ORISSA

Eastern Regional Committee

This scheme had no regional significance and it was referred to the Animal Nutrition Committee. The State Animal Nutrition Research Officer (Shri Patnaik) should be present when the scheme is discussed by the Committee.

Animal Nutrition Committee

The chairman pointed out that great emphasis was laid on the significance of this type of work at the International Animal Husbandry Conference recently held at Madrid. The Committee was of the opinion that this problem is both of regional and fundamental importance and made the following recommendations :—

(a) that the State Government should meet 50% of the expenditure ;

(b) that the technical programme should be prepared in consultation with the Head of the Division of Animal Nutrition, Indian Veterinary Research Institute, and the Statistical Adviser, Indian Council of Agricultural Research;

(c) that instead of the ordinary sheds, metabolism should be constructed within the proposed amount ;

(d) that the maintenance charges at the rate of As. -/8/- per day per goat should also cover the cost of feeding the followers ; and

(e) that any receipts from the sale proceeds of meat, milk etc. of the animals should be shared by the Indian Council of Agricultural Research.

SUBJECT NO. N-5

RESPONSE OF DIFFERENT BREEDS TO DIFFERENT LEVELS OF NUTRITION—NEW SCHEME—WEST BENGAL

Eastern Regional Committee

This scheme had no regional significance and it was referred to the Animal Nutrition Committee.

Animal Nutrition Committee

The Committee felt that the objective and scope of the scheme should be more clearly defined and suggested that the work of this scheme should be restricted to study the comparative utilisation of regional fees by different species of animals, namely Hariana cattle, Murrah buffalo and Black Bengal goat. The Committee recommended the scheme subject to the following :—

(a) on account of its regional significance the cost of the scheme should be shared by the State Government on 50:50 basis and before the revised scheme comes for consideration by the Advisory Board, the approval of the State Government to contribute its share should be obtained ;

(b) the technical programme should be drawn up in consultation with the Head of the Division of Animal Nutrition, Indian Veterinary Research Institute, Izatnagar and the Statistical Adviser, Indian Council of Agricultural Research ;

(c) the posts of Microbiologist and peon should be deleted. Instead of two Laboratory Assistants, provision may be made for one Laboratory Assistant and one Laboratory Attendant ;

(d) the travelling allowance may be reduced from Rs. 1,000 to Rs. 500 per year ;

(e) item (iii) of Contingencies *i.e.* gas, light and water should be deleted;

(f) provision for books should be reduced to Rs. 300 in the first year and Rs. 200 each during the second and third years ;

(g) expenditure on furniture amounting to Rs. 500 may be allowed only during the first year ;

(h) item (vi) under contingencies, *i.e.* petty construction and repair, be reduced to Rs. 200 during second and third years ;

(i) as no animals will be purchased, only upkeep should be considered under item (x) of the Contingencies. Provision should be modified accordingly ;

(j) two 'mazdoors' may be appointed on a permanent basis and the remaining upto a maximum of 10 appointed according to the requirements of the experiment. The budget provision should be made according to the prevailing wages of mazdoors.

The Committee desired that the scheme should be revised in the light of above remarks.

SUBJECT NO. N-6

EVALUATION OF VITAMIN ADEQUACY AND SPECIFIC METABOLIC FUNCTIONS IN LIVESTOCK—NEW SCHEME—WEST BENGAL

Eastern Regional Committee

This scheme was recommended, subject to the following remarks :

(i) The technical programme should be drawn up in detail and it should be more precise ;

(ii) The scheme should be sanctioned only if adequate laboratory accommodation and necessary facilities are guaranteed by the State Government ;

(iii) The work of this scheme may be done under the over-all guidance of the Officer-in-charge, Regional Animal Nutrition Research Station, but this should not hamper his normal duties ;

(iv) The Officer-in-charge, Regional Animal Nutrition Research Station (Dr. Chanda) should be present when this scheme is discussed at the next meeting of the Animal Nutrition Committee.

Animal Nutrition Committee

The Committee recommended the scheme provided :

- (a) That the State Government agreed to contribute 50 per cent of the total expenditure.
- (b) That the state Government guaranteed that (i) adequate Laboratory accommodation and necessary facilities will be provided for the purpose and (ii) that the overall guidance of the scheme would not hamper the normal duties of the Officer-in-charge of the Eastern Regional Animal Nutrition Station.
- (c) The programme of work which is considered too ambitious is made precise and the revised technical programme submitted for the consideration of the Animal Nutrition Committee at its spring meeting.
- (d) Provision of a higher initial pay up to Rs. 350 in the scale of Rs. 250—750 was considered desirable because of the specialised nature of work and the experience required to conduct this work.
- (e) The posts of Assistant Biochemist, Typist clerk and peon should be deleted. Instead of two Laboratory Assistants, one Laboratory Assistant and one Laboratory Attendant may be provided.
- (f) Provision for item (i) under contingencies may be reduced to Rs. 3,000 for the first year and Rs. 2,000 each for the subsequent two years.
- (g) Provision for item (ii) should be reduced to Rs. 2,500 for the first year and Rs. 2,000 each for the second and third, while that for item (iii) should be deleted.
- (h) Provision for books only (not periodicals) should be reduced to Rs. 500 for each year.
- (i) Expenditure on furniture amounting to Rs. 500 may be allowed only during the first year.
- (j) Necessary details of cost *i.e.* rate etc., for item (ix) and (x) should also be given.
- (k) Receipts, if any, should be shared equally by the Council and State Government.

The Committee desired that the State Government may be asked to revise the scheme in the light of the above remarks. The concurrence of the State Government for meeting 50% of the total expenditure may be first obtained before submitting the revised scheme to the Advisory Board.

SUBJECT NO. N-7

INVESTIGATIONS ON THE NUTRITIONAL REQUIREMENTS OF PIGS—NEW SCHEME—I.V.R.I.

Southern Regional Committee

Dr. Kehar in explaining the scheme mentioned the importance of pigs in the economy of India and how the pigs could utilise feeds which cattale would not eat. Information on the fundamental aspect of pig nutrition would be of very great value to different parts of the country and particularly in National Extension Centres where pig rearing was being taken up.

After further discussion it was decided that the scheme should be supported subject to the condition that it should merge into the normal work of the Nutrition Section as soon as their expansion under the Second Five Year Plan was given effect to.

Northern and Temperate Regional Committee (Joint meeting)

Dr. Kehar explained the object of the scheme and said that, besides studying other aspects, special attention will be paid to the quality of pork produced on different planes of nutrition, particularly the muscle fat proportions.

Dr. Kaura mentioned the demand from U. K. and other foreign countries for good quality pork from India and said that the subject was of considerable importance. He further desired that cheap and economical rations should be worked out, making maximum use of such waste materials as were not used for feeding cattle etc.

The recommendations of the Southern Regional Committee were endorsed, subject to the remarks that (i) the work should be done on indigenous as well as graded pigs and (ii) cheap feeding stuffs and other waste materials as were easily available locally should be utilised.

Animal Nutrition Committee

The Committee recommended the scheme and endorsed the suggestions made by the Regional Commitees ; that—

(1) the scheme should merge into the normal work of the Animal Nutrition Division as soon as their expansion under the Second Five Year Plan was given effect to ;

(2) the indigenous and graded pigs should be used for experimental purposes ;

(3) efforts should be made to utilise cheap feeding stuffs and other waste materials as may be easily available locally.

The Committee further recommended that correction in respect of the pay of two Research Assistants and Laboratory Attendants as also the upkeep of animals may be made.

Receipts from the sale proceeds be credited to the Indian Council of Agricultural Research.

In view of the highly specialised nature of work envisaged under the scheme, the Committee supported the proposal for a higher initial start to a suitably trained man.

SUBJECT NO. N-8

INVESTIGATIONS ON THE EFFECT OF NUTRITION ON ANIMAL PRODUCTS IN COWS AND BUFFALOES—INDIAN VETERINARY RESEARCH INSTITUTE

Southern Regional Committee

Dr. Kehar pointed out that this subject arose out of the conference in Madrid where it was emphasised that feeding affects not only growth and production but also the quality of produce like milk, its fat content, mineral content and so on.

After discussion it was decided that the scheme should be considered by the Dairy Science and Animal Nutrition Committees, jointly if possible, and the work should be done at Indian Dairy Research Institute or Indian Veterinary Research Institute or both, as part of their normal work, in accordance with the decision of the two Committees.

Northern and Temperate Regional Committees (Joint meeting)

There was no regionalization involved in this scheme. It was recommended for examination by the Animal Nutrition Committee.

Dairy Science Committee

The Committee felt that the work envisaged in the scheme was quite good and observed that similar type of work was already being carried out at that National Dairy Research Institute and other Centres also. It was felt that if Indian Veterinary Research Institute proposed to carry out such investigations as part of normal activities of the Institute, it would be very useful.

Animal Nutrition Committee

In endorsing the recommendations of the Eastern, Southern, Temperate and Northern Regional Committees, the Committee felt that the work envisaged in the scheme is interesting and useful but thought that it could be taken as a part of the normal work of the two institutes, namely, Indian Veterinary Research Institute and National Dairy Research Institute.

SUBJECT NO. N-9

INVESTIGATION ON THE QUALITY OF WOOL AND MEAT IN RELATION TO THE NUTRITION OF SHEEP—BALWANT RAJPUT COLLEGE, AGRA

Regional Committees

Not considered.

Animal Nutrition Committee

The Commitee recommended the scheme and desired that :—

(1) In view of heavy mortality in sheep the number of animal under item J may be raised from 24 to 50,

(2) the scales of pay for Assistant Research Officer, Lab. Attendants, Lab. Assistant-cum-clerk and the Senior Research Assistant should be adjusted according to the U.P. scales of pay,

(3) in view of the specialised nature of work the initial start up to a Rs. 350 was considered essential,

(4) under item K upkeep of animal at the rate of As. -/8/- should also cover the cost of feeding the followers,

(5) provision under item (ii) of contingencies, *i.e.* Apparatus and Dead Stock may be raised from Rs. 1,000 to Rs. 3,000 for the first year,

(6) all receipts should be credited to the Indian Council of Agricultural Research.

SUBJECT NO. N-10

INVESTIGATION ON THE CAUSES OF DEGENERATION OF CATTLE IN HUMID CLIMATE AT CALCUTTA, HISSAR AND IZATNAGAR—EXTENSION PROPOSAL

Animal Nutrition Committee

The Committee recommended the extension of the scheme for a period of two years and recommended that :—

(1) the post of Research Assistant at Calcutta should be upgraded, because of the increased number of animals and the additional work in connection with the milch animals and young stock ;

(2) the creation of the post of Supervisor is considered necessary ; for when the Research Assistant goes to Izatnagar or Hissar or on short leave, there is no other technical man to look after the work of the scheme and observation on milch animals and young stock cannot be taken care of by untrained men ;

(3) the provision under G to I were considered to be in order ;

(4) provision for special pay of Rs. 50 to Shri Kapil Raj Suri at Hissar should be included in the budget ;

(5) the three animals which died at Hissar and one at Calcutta may be replaced by animals as far as identical to those selected for this experiment. Separate provision is not necessary because the Hissar animals will be obtained from the farm free of cost and will continue to be the property of the Punjab Government. The approximate cost of Rs. 50 for the Bengal animals will be met from the sanctioned budget.

SUBJECT NO. N-11

UTILIZATION OF WASTE PRODUCTS AS FOOD FOR CATTLE IN ORISSA—EXTENSION PROPOSAL

Animal Nutrition Committee

The Committee recommended the extension of the scheme for a period of three years and suggested that :—

(a) the percentage of waste products should be raised to 20 to 40 instead of 10 to 20 per cent ;

(b) the amount under T.A. should remain as applied for.

It was brought to the notice of the Committee that no progress report of the scheme has so far been submitted since its commencement in December, 1954. It was, therefore, desired that both the outstanding and the current reports should be submitted in time.

SUBJECT NO. N-12

SCHEME FOR INVESTIGATION OF PHYSIOLOGICAL NORMS OF INDIAN CATTLE WITH SPECIAL REFERENCE TO WEST BENGAL—EXTENSION PROPOSAL OF THE

Animal Nutrition Committee

The attention of the Committee was drawn to the fact that no report was received on the progress of work since the scheme started on 1st September, 1954 nor were the details of the results achieved so far given in the extension proposal. It was thus difficult for the Committee to assess the value of the work completed so far. The Committee, therefore, did not consider it advisable to recommend the extension unless both these reports were submitted and their value adjudged at its spring meeting.

SUBJECT NO. N-13

SCHEME FOR FURTHER WORK ON PADDY STRAW—INDIAN VETERINARY RESEARCH INSTITUTE, IZATNAGAR WITH FIELD UNITS IN KANGRA AND ASSAM—EXTENSION

Animal Nutrition Committee

The etxension proposal was recommended. The Committee felt that :—

(1) in view of larger number of animals and of metabolic trials involved, provision of another Research Assistant is justified ;

(2) the provision suggested under E to O are in order; and

(3) the estimate of expenditure for the first year (1957-58) should be made for only 5 months, *i.e.* November to March.

SUBJECT NO. N-14

SCHEME TO STUDY THE VALUE OF UREA AS A PROTEIN SUBSTITUTE IN THE RATIONS OF COWS AND BUFFALOES FOR GROWTH AND MILK PRODUCTION—INDIAN VETERINARY RESEARCH INSTITUTE—REQUEST FOR ADDITIONAL GRANT

Animal Nutrition Committee

The Committee recommended the proposal for the additional grant for the purchase and upkeep of animals.

O.—DAIRY SCIENCE

SUBJECT NO. O-1

SCHEME TO STUDY 'LET DOWN' RESPONSE OF SOME BREEDS OF INDIAN COWS AND BUFFALOES AND THE SCOPE OF MILKING THEM MECHANICALLY,—NEW SCHEME ANDHRA

Regional Committee

Not considered.

Dairy Science Committee

The scheme was discussed in detail. In view of the general feeling expressed by the Committee it was suggested that Col. Murari may be requested to redraft the scheme and submit it for consideration at the next meeting. In preparing the scheme it was suggested that the similar scheme sanctioned for Haringhata Farm may be consulted. It was also felt that the revised scheme should include a brief review of the literature on the work already carried out in India and indicating how the proposed new work differs from that already done.

SUBJECT NO. O-2

SURVEY OF BACTERIOLOGICAL QUALITY OF MILK SUPPLY IN ANDHRA—NEW SCHEME—ANDHRA

Dairy Science Committee at its meeting held on the 7th-9th April 1956 :

(c) *Prolbems recommended by the Board of Research*

The Animal Husbandry Commissioner presented a list of eight problems of research in dairy science recommended by the Board of Research of Indian Council of Agricultural Research in previous years and suggested that they should be taken into consideration in drawing up the programme of research work.

(1) *Clean milk production.*

It was stated that considerable amount of information on this aspect had been obtained in the course of the investigations on bacteriological survey of market milk sposnored by the Indian Council of Agricultural Research. One such scheme was now running at Anand and two more were sanctioned for Calcutta and Delhi. During the working of these schemes data regarding sources of infection in milk, etc., would be collected and the effect of introducing improved measures for clean milk production would also be observed.

The Committee approved the idea of starting similar schemes of bacteriological survey of milk at two other centres *viz.* Allahabad and Vizagapatnam. The work at Allahabad should be undertaken by the Agricultural Institute in co-operation with the Dairy Development Officer of U.P. In regard to Vizagapatnam, the scheme could be worked out at new dairy laboratory proposed to be established by the Animal Husbandry Department, Andhra State, there. Model schemes should be prepared and sent to these two centres for suitable modifications and submission to the Indian Council of Agricultural Research.

Eastern Regional Committee

A co-ordinated regional scheme on this subject had already been accepted in principle. This particular scheme should be examined by the Dairy Science Committee.

Southern Regional Committee

In endorsing the recommendations of the Eastern Regional Committee, this committee pointed out that similar schemes had been sanctioned for Anand, Delhi and Calcutta and the Dairy Science Committee should examine and decide whether more centres were needed than the three already sanctioned and, if so, where.

Dairy Science Committee

The Dairy Science Committee considered the scheme and approved its adoption. They, however, felt that the scheme should be located for housing in a more or less permanent place which should be provided by the State Government and hence the provision of additional Rs. 15,000/- asked for construction of temporary sheds was not accepted.

It was also felt that the scheme should include common chemical quality control tests such as testing of acidity, fat, S.N.F. contents of milk and equipment for these should be provided for.

One Research Assistant, One Laboratory Assistant, and Two Milk Testers and two Laboratory Attendants were considered necessary for this investigation. The classification of Veterinary Assistant Surgeon, Veterinary Livestock Inspector, Fieldman, and Stockman and Compounder were recommended to be deleted.

SUBJECT NO. O-3

SURVEY OF BACTERIOLOGICAL QUALITY OF MILK SUPPLY IN ALLAHABAD—NEW SCHEME—ALLAHABAD AGRICULTURAL INSTITUTE

Dairy Science Committee at its meeting held in April 1956.

Please see against item O-2.

Eastern Regional Committee

A co-ordinated regional scheme on this subject had already been accepted in principle. This particular scheme should be examined by the Dairy Science Committee.

Southern Regional Committee

In endrosing the recommendations of the Eastern Regional Committee, this Committee pointed out that similar scheme had been sanctioned for Anand, Delhi, and Calcutta and the Dairy Science Committee should examine and decide whether more centres were needed than the three already sanctioned and if so, where.

Dairy Science Committee at its meeting held in October 1956.

Remarks on 6(3) *of the I.C.A.R. Office note* :

The Committee was given to understand by Prof. Warner that the honorarium would be utilised for payment of Ministerial and other clerical help in running the scheme. It was also stated by Prof. Warner that in a separate scheme for Poultry work similar honorarium had been actually approved. The Committee felt that the Council might consider favourably the giving of this help to Allahabad Agricultural Institute.

Remarks on 6(4)

The Committee discussed the provision of two Research Assistants for the scheme and felt that this may be reduced to one.

Remark on 6(5)

The Committee discussed in detail the question purchase of minor articles, petty construction, Gerber centrifuge, bicycles, and PH meter. All these items were considered necessary to run the scheme efficiently and were recommended.

Remarks on 6(6)

Prof. Warner explained that although the grade for Research Assistant was Rs. 85-10-175/200-10-250 in the Allahabad Agricultural Institute, their practice was usually to start an M.Sc. on Rs. 150/- p.m. However, since this particular salary did not fall in their grade, he had suggested a start of Rs. 155/- p. m. The Committee felt that an M.Sc. qualified candidate was essential for this work and therefore the higher start proposed by the Allahabad Institute for Research Assistants should be approved.

The Committee recommended the acceptance of the scheme with the above modifications and suggestions. It was also felt that as the results became available with the progress of the scheme, the Co-operative Milk Union, Allahabad, U.P. should take advantage of the results to improve the quality of their milk supply conditions.

SUBJECT NO. O-4

ECONOMICS OF SPECIALIZED DAIRY FARMING—NEW SCHEME—WEST BENGAL.

Eastern Regional Committee on Model Scheme

This important scheme was recommended, subject to the following suggestions :—

(i) Number of animals per unit area may be suitably reduced in order to provide for the maintenance of essential number of followers.

(ii) The animals to be used in this scheme should be provided by the farm in which the scheme is to run except in cases where a particular herd is not available. the required number of animals would have to be purchased for which necessary provision should be made.

(iii) Provision should be made to have control plots for obtaining comparative data in regard to the income which could be derived if the area was utilized purely for crop production.

(iv) The net cost of the scheme should be revised so as to indicate the total cost and receipts separately.

(v) Work should be taken up at the following centres and control plots should be provided in each case.

Haringhata (Hariana & Murrah)—Both 5 & 10 acre plots.
Karnal (Tharparkar & Murrah)—5 & 10 acre plots
Housur (Sindhi)—5 & 10 acre plots.
Hessarghata (Mysore) (Cross-bred *animals*) 5 acre plots.
Izatnagar (Hariana & Murrah)—5 & 10 acre plots.
U.P. (Hariana)—5 & 10 acre plots.
Saurashtra (Gir)—5 acre plots.

(vi) The States concerned should be asked to submit specific schemes before the end of September so that they can be placed before the Scientific Committee.

(vii) The technical details would be examined by the Animal Breeding Committee.

Southern Regional Committee

The Chairman explained that Dr. Sikka had produced certain convincing data from Australia which showed the specialized Dairy Farming was a great success in that country even when milk was sold in the form of butter. After further discussion, the Committee endorsed the recommendations of the Eastern Regional Committee with the following additions :—

(a) The scheme should be examined by the Statistician.

(b) Andhra might be added so that buffaloes in Tungabhadra area might also be included in the study.

There were a few mistakes in the recommendations of the Eastern Regional Committee as typed.

In item No. 2, 3rd line, the word should be 'breed' and not 'herd'.

In item No. 3, last line, it should be 'commercial crop production' and not only 'crop production'.

In item No. 5, Murrah should be excluded under Karnal.

Northern and Temperate Regional Committee

The Animal Husbandry Commissioner mentioned the observation made by the Indian delegation which visited Australia last year that specialised dairy farming there was giving more economical returns than mere crop production. Consequently a scheme for studying the possibilities of following a similar practice in India had been prepared. He further emphasised that it would be necessary (i) to include only high yielders in the experimental work, (ii) to provide for an essential number of followers, and (iii) to restrict the studies as far as possible to animals already available on the farms. The Animal Husbandry Commissioner further remarked that, if good results were obtained as a result of work on the centres at present recommended under the scheme, the question of including more centres will be taken up.

The reocmmendations of the Eastern Regional Committee and Southern Regional Committee were endorsed with the remarks that (i) the title of the scheme may be changed to read 'Economics of specialised dairy farming, and (ii) in addition to centres from which schemes are to be invited as recommended by the regional committees, Punjab and Agricultural Institute, Anand might also be asked to submit schemes for work on Hariana and Kankrej breeds respectively.

Dairy Science Committee

The Committee had a thorough discussion on the subject and felt that the scheme was very important. The Committee approved the scheme in principle with a suggestion that an arable farm holding should be included as control for comparison. It was also pointed out that the scheme as drawn up did not show the net annual income expected. Therefore, it was suggested that the procedure for working out the cost might be prepared in consultation with the statistician and the balance sheet of the scheme submitted to the Indian Council of Agricultural Research Secretariat before it was presented to the Advisory Board. The Committee approved of the scheme and recommended the sharing of non-recurring expenditure also. The post of a peon in the staff provided was suggested to be deleted.

Animal Breeding Committee

The Chairman introduced the subject, explained the genesis of the scheme and the recommendations of the various Regional Committees.

After discussion, the Committee endorsed the recommendation made by the Dairy Science Committee on this subject. (Appendix IV).

The Committee also endorsed the recommendation of the Dairy Science Committee with regard to the scheme submitted by Madras and Anand on the same subject. The Indian Veterinary Research Institute Scheme was not examined by the Dairy Science Committee. The Committee recommended that it may be approved on lines of the Haringhata Scheme. The expenditure is to be borne entirely by the Indian Council of Agricultural Research and the pay of the employees should be on the Central Scale.

Agricultuarl Economics Committee

It was generally felt that the study was likely to be of a very great value. However, as some important questions were involved, it was recommended that the scheme should be examined by a joint subcommittee constituted from among the members of Agricultural Economics and Dairy Science Committees and its report should be placed before the next meeting of the Agricultural Economics Commitee.

Statistical Committee

The Committee noted the recommendations of the Agricultural Economics Committee and recommended that the subject should again be put up to it for detailed scrutiny of the design of the experiment after the scheme was revised by the proposed joint meeting of the Sub-Committees of Agricultural Economics and Dairy Science Committee.

SUBJECT NO. O-5

ECONOMICS OF SPECIALIZED DAIRY FORMING—NEW SCHEME—AGRICULTURAL INSTITUTE, ANAND

Regional Committees

Please see remarks on Model Scheme given under item No. O-4.

Diary Science Committee

The scheme was approved by the Committee in principle subject to the following modifications :—

(1) The replacement rate of follower-stock as shown on page 2 was felt to be insufficient and recommended to be reexamined.

(2) The expenditure statement should be revised taking into consideration the amount to be spent on technical staff and other overhead expenditure and a balance sheet of the scheme should be drawn.

(3) The Anand Agricultural Institute being an organised Farm should make available the animals required for the scheme and the purchase of animals for such a scheme was not considered necessary.

(4) As regards the financing of the scheme, the Indian Council of Agricultural Research might consider whether the entire amount could be financed by the Indian Council of Agricultural Research in view of the institution being a private one.

Animal Breeding Committee

Please see against item No. O-4.

SUBJECT NO. O-6

ECONOMICS OF SPECIALIZED DAIRY FAMING—NEW SCHEME, INDIAN VETERINARY RESEARCH INSTITUTE

Regional Committees

Please see remarks on Model Scheme given under item No. O-4.

Dairy Science Committee

Not considered.

Animal Breeding Committee

Please see against item No. O-4.

SUBJECT NO. O-7

ECONOMICS OF SPECILIZED DAIRY FARMING—NEW SCHEME—MADRAS

Regional Committees

Please see remarks on the Model Scheme against item No. O-4.

Dairy Science Committee

The Committee felt that the scheme was drawn up on the model of West Bengal scheme. As conditions in West Bengal area were not similar to that prevailing at Hosur where climate and soil conditions were different, it was suggested to revise the scheme to suit the local conditions so that specialised dairy farming might be economical.

It was felt that a Specialised Dairy Farming Scheme should be worked out at the National Dairy Research Institute, Karnal.

Animal Breeding Committee

Please see against item No. O-4.

Agricultural Economics Committee

It was decided that the scheme should be prepared by the State Government after the model scheme under item No. O-4 has been finalized.

P.—ANIMAL DISEASES

SUBJECT NO. P-1

D.I.O. SCHEME—EXTENSION, TRAVANCORE-COCHIN

In recommending the extension of the scheme the Animal Diseases and Pests Committee observed that an on-the-spot examination of the working of the scheme at an early date was desirable, when revised technical programme might be prepared and the question of deputing the D.I.O. to the Indian Veterinary Research Institute for training might also be considered. The revised programme should then be put up to the Committee at its next meeting to be held in March, 1957.

SUBJECT NO. P-2

HUMPSORE SCHEME—EXTENSION, ORISSA

The Parasitology Committee recommended the extension of the scheme with the following remarks :—

(a) For chemicals and apparatus a sum of Rs. 1,000/- only might be sanctioned for each year.

(b) For purchase and maintenance of experimental animals a sum of Rs. 500/- only might be sanctioned for each year.

(c) For miscellaneous contingencies, the amount of Rs. 500/- for each year as sanctioned in the original scheme might be allowed and it was not necessary to increase it.

The Animal Diseases and Pests Committee endorsed the above recommendations of the Parasitology Committee.

SUBJECT NO. P-3

A.D.I.O. (SHEEP AND GOATS)—EXTENSION, UTTAR PRADESH

The extension proposal was recommended subject to the following remarks :

(i) The additional staff asked for might be sanctioned with the exception of the shepherd; and

(ii) The non-recurring expenditure should be borne entirely by the State Government.

SUBJECT NO. P-4

MASS INVESTIGATION OF VILLAGE POULTRY AGAINST RANIKHET DISEASE—EXTENSION, BOMBAY

The Animal Diseases and Pests Committee did not recommend the extension of the scheme.

SUBJECT NO. P-5

BOVINE CONTAGIOUS PLEURO-PNEUMONIA—EXTENSION, ASSAM

The Animal Diseases and Pests Committee agreed that the report of the *ad hoc* Committee appointed to examine the working of the scheme might be put up direct to the Advisory Board through the Chairman of the Animal Diseases & Pests Committee.

SUBJECT NO. P-6

BIONOMICAL STUDIES OF COMMON FLUKES—NEW SCHEME. WEST BENGAL

The Eastern Regional Committee considered the scheme and remarked that the programme of the scheme was much too ambitious. In view of this, and the fact that work on most of the parasites had already been undertaken at the Indian Veterinary Research Institute, it was suggested that a revised scheme confined to the study of a few important parasites peculiar to West Bengal (*Eurvtrema pancreaticun, Fasciolopsis,* buski, etc.) should be prepared and put up to the Parasitological Committee and the Animal Diseases and Pests Committee latest by the 20th September, 1956.

The Parasitology Committee recommended the scheme for sanction with the following remarks :—

(a) The title of the scheme should be changed to "Studies on the life history and bionomics of *Eurytrema Pancreaticum, Fasciolopsis buski, Gastrodiscoides hominis and Stephanurus dentatus*".

(b) The text of the scheme to be modified in view of the inclusion of E. *pancreaticum* in it.

(c) For the first year, only one Research Assistant and Laboratory Attendant might be sanctioned. The question of providing an additional R.A. and Laboratory attendant might be examined next year in the light of the progress made during the first year.

The Animal Diseases and Pests Committee endorse above recommendation of the Parasitology Committee with the remarks that as the scheme would be worked under the technical supervision of the Assistant Professor of Parasitology, he should be named as the Technical Officer-in-charge of the scheme.

SUBJECT NO. P-7

STUDIES ON MYCOTIC DISEASES—NEW SCHEME, WEST BENGAL

The Eastern Regional Committee remarked that there was no special regional significance in this scheme. It was recommended for further examination by the Scientific Committee with the following remarks :—

(i) Detailed technical Programme should be submitted;

(ii) Provision should be made for the Officer-in-Charge of the scheme to acquire suitable training in Mycology, Mycological technique; and

(iii) The cost should be shared by the Council and the State Government on the usual 50:50 basis.

The Animal Diseases & Pests Committee recommended the Scheme for sanction with the following modifications :—

(1) The Officer-in-charge of the scheme should be appointed and got trained at the school of Tropical Medicine for a period of about 3-6 months.

(2) The staff should be reduced by the Research Assistant and one Laboratory Attendant.

(3) The post of Animal Attendant should be deleted.

(4) The cost of experimental animals should be reduced to Rs. 1,000/- only.

SUBJECT NO. P-8

STUDIES IN ANIMAL FILARIIDS AND FILARIASIS—NEW SCHEME, BIHAR

The Eastern Regional Committee recommended that this scheme might be referred back to the State Government for modification with a view to undertaking investigations on the life-histories of only *Setariacervi and Parafilaria bovicola.*

The scheme was recommended for sanction by the Animal Diseases and Pests Committee with the following remarks :—

(1) Item 1 of the technical programme should be deleted.

(2) Staff :

(i) Entomologist should be in junior Class II scale.
(ii) One R. A. should be deleted.
(iii) Only one Insect Collector should be provided.
(iv) Peon to be deleted.
(v) One Laboratory Assistant-cum-typist to be provided instead of steno-typist.

(3) The duration of the scheme should be 3 years.

(4) The non-recurring expenditure should be borne entirely by the State Government.

(5) Travelling allowance should be reduced to Rs. 1,000/- per year.

(6) Contingencies including service stamps, stationery and printing and miscellaneous Rs. 1,000/- per year.

(7) Glass-ware and chemicals Rs. 500/- per year.

(8) Purchase and upkeep of experimental animals Rs. 1,000/- per year.

(9) Repairs and running cost of jeep and furniture to be deleted.

SUBJECT NO. P-9

INVESTIGATIONS ON BRUCELLOSIS—NEW SCHEME, BIHAR

The Eastern Regional Committee suggested that the scheme be referred to the Animal Diseases and Pests Committee for detailed technical scrutiny with particular reference to the two other schemes on the subject already sanctioned by the Council in Uttar Pradesh and Madras.

As work on brucellosis was of very great importance in the development of country's livestock, the scheme was recommended for sanction by the Animal Diseases and Pests Committee with the following remarks and subject to conditions laid down below :—

1. That this and other schemes on Brucellosis in the States should be operated on a coordinated basis.

2. That a scheme might also be started at a Central Institute like the Indian Veterinary Research Institute which also acting as a F.A.O./W.H.O. Brucellosis centre for carrying out fundamental research on brucellosis as well as for the supply of standard strains, antigens etc., conforming to international standards and for coordinating the work of the schemes operating in the States.

Conditions:

1. One post of Laboratory Attendant might be converted into that of Laboratory Assistant.

2. The post of sweeper be deleted.
3. Peon may be allowed.
4. T.A. to be reduced to Rs. 2,500/- p.a. *i.e.* Rs. 12,500/- for 5 years.
5. Allotment for vaccines and medicines be reduced to Rs. 3,500/- for the total period of 5 years.
6. Amount of contingencies be reduced to Rs. 500/-.
7. Allotment for the purchase of experimental animals be reduced to Rs. 3,000/-.
8. Upkeep and maintenance of animals be reduced to Rs. 3,000/-.
9. Provision for the purchase of jeep, petrol etc. to be deleted.
10. The clerk-cum-typist should be provided by the State Government from their own funds.

SUBJECT NO. P-10

CONTROL OF H. S. BLACK QUARTER AND ANTHRAX IN ENDEMIC AREAS—NEW SCHEME, MADRAS

The Southern Regional Committee felt that this was more or less a scheme for mass vaccination in one area where all the animals would be protected against all the three diseases simultaneously. They felt that H.S. was a disease which could not be eradicated, as a proportion of animals were carriers, and Black Quarter and Anthrax were Soil-borne diseases. Under these circumstances eradication would be extremely difficult, but an effective control could be aimed at and achieved.

After further discussion, it was decided that the scheme should be supported, but it should be examined in detail by the Animal Diseases & Pests Committee, which should revise the programme so that the subject might first be studied under laboratory conditions and then extended to the field.

The Animal Diseases & Pests Committee was of opinion that a scheme of this sort could not be recommended as the work proposed to be carried out was of a developmental nature. In view of the fact, however, that a scheme had recently been sanctioned for the manufacture of improved H.S. and other vaccines. further staff for carrying out field trials to assess their value in the control of these diseases under field conditions might be asked for under that scheme in due course after suitable vaccines had been developed.

SUBJECT NO. P-11

STUDY OF RICKETTSIAL INFECTIONS IN DOMESTICATED ANIMALS—NEW SCHEMES, MADRAS

The Southern Regional Committee felt that there was no question of regionalisation in this scheme and they recommended that the scheme should be placed before the Parasitology and Diseases and Pests Committee.

As existing knowledge did not suggest that Rickettsial infections were of great importance in this country, the Animal Diseases and Pests Committee did not consider it necessary to sanction a scheme for work on these conditions at this stage. It was suggested that for the present some individual officers working in the States might take up work of an exploratory nature to determine the probable incidence of rickettsial infections and, if results of such investigations justified, a scheme might be put up in due course.

SUBJECT NO. P-12

APPOINTMENT OF ASSISTANT RESEARCH OFFICER (ASCARIASI)—NEW SCHEME, ANDHRA

The Southern Regional Committee considered this scheme to be of great importance but suggested that its title should be changed to 'a scheme for investigation of suitable methods for the control of Ascariasis' and that the scheme should be examined in detail, first by the Parasitology Committee and then by the Animal Diseases and Pests Committee. Apart from scrutiny of the technical programme. the Parasitology Committee should decide the exact site where the scheme should be located. In the meanwhile the Director should indicate what material and facilities were available for doing the work.

The Parasitology Committee recommended the scheme for sanction with the following remarks :

(a) The title of the scheme should be changed to "A scheme for investigation of suitable methods for the control of Ascariasis in calves."

(b) The scheme should be worked on a Government buffalo breeding farm.

(c) A survey of the incidence of Ascariasis in the rural areas need not be carried out.

(d) Instead of a lower division clerk, a Laboratory Assistant knowing type-writing might be provided.

(e) A peon was not necessary.

(f) Travelling allowance be reduced to Rs. 750/- per year. Under contingencies, the provision for Books and Periodicals, cost of animals (including their maintenance), and miscellaneous expenses should be modified and Rs. 250 and Rs. 200/- respectively might be sanctioned.

The Animal Diseases & Pests Committee endorsed the above recommendations of the Parasitology Committee.

SUBJECT NO. P-13

INVESTIGATING THE POSSIBILITIES OF LARGE SCALE MANUFACTURE OF H. S. ADJUVANT VACCINE—NEW SCHEME, INDIAN VETERINARY RESEARCH INSTITUTE

Eastern Regional Committee

This was a scheme of all-India importance and was recommended. pending examination of details by the Animal Diseases and Pests Committee.

Southern Regional Committee

Shri Sahai explained the main contents of the scheme and said that a more potent vaccine for controlling H.S. was needed than the one used at present which had the defect of not conferring sufficiently long immunity. The new vaccine that had been prepared conferred a much longer scale manufacture of the new vaccine, improvement of technique in its manufacture and for carrying out of further field tests on its efficacy.

Shri Sahai added that the scheme was fianancially self-supporting as the vaccine would be charged for.

In endorsing the recommendations of the Eastern Regional Committee this Committee recommended that the States also may taken up the work, if possible, by obtaining essential information from the Indian Veterinary Research Institute.

Northern and Temperate Regional Committee

Shri Sahai informed that fairly extensive laboratory trials had been conducted on the adjuvant vaccine prepared at Mukteswar and the immunity had been found to last for at least 9 months. Thus, the new vaccine was definitely superior to any other available vaccine for this disease. The adjuvant vaccine was, however, difficult to prepare, and its large-scale manufacture was likely to be beset with many difficulties, which will have to be overcome. Moreover, it was also desirable to conduct large-scale field trials in endemic areas to further prove the efficacy of this vaccine. Shri Sahai also said that the scheme would be self-supported scheme. In response to a query Shri Dhanda informed that the technique of preparing the new Mukteswar vaccine differed in certain essential steps from that adopted by Bains.

The recommendations of the Eastern Regional Committee and Southern Regional Committee were endorsed.

Animal Diseases & Pests Committee

The Committee recommended the scheme for sanction with the remark that as large quantities of the vaccine were proposed to be prepared, the scheme was not susceptible to any reduction in funds under various items.

SUBJECT NO. P-14

KEEPING QUALITY OF VETERINARY BIOLOGICAL PRODUCTS —NEW SCHEME, INDIAN VETERINARY RESEARCH INSTITUTE

Eastern Regional Committee

The Scheme was recommended, pending detailed technical scrutiny by the Animal Diseases and Pests Committee.

Southern Regional Committee

Shri Sahai explained the salient features of the scheme and said that though the scheme was simple, it would take a long time to ascertain the keeping quality of the biological products. He said that many vaccines were being produced and distributed by the Indian Veterinary Research Institute under varying conditions of storage and transport. It was extremely important that the keeping quality of these various biological products should be ascertained so that its effective use might be promoted.

In reply to a query, Shri Sahai explained that the keeping quality was measured by the reactions on the experimental animals and that the technique to be employed differend with different vaccines.

The Committee endorsed the recommendations of the Eastern Regional Committee.

Northern Regional Committee

Shri Sahai explained the need for collecting accurate information on the keeping quality of different kinds of commonly used bacterial and virus vaccines, sera, antigens etc. He said that the technique of testing must necessarily vary from product to product and that a detailed plan would be drawn up and put up to the Animal Diseases and Pests Committee.

The recommendations of the Eastern Regional Committee and Southern Regional Committee were endorsed.

Animal Diseases and Pests Committee

The Committee recommended the scheme for sanction with the following modifications :—

1. Provision for apparatus might be reduced to Rs. 5000/- for each year.
2. Provision for T.A. might be reduced to Rs. 1,500/- per year.
3. Provision for furniture might be deleted.

SUBJECT NO. P-15

STUDIES IN BOVINE ANAESTHESIA—NEW SCHEME, ORISSA

Eastern Regional Committee

The Scheme was recommended for detailed technical scrutiny by the Animal Diseases and Pests Committee.

Animal Diseases & Pests Committee

The Committee recommended the scheme for sanction.

SUBJECT NO. P-16

INVESTIGATION OF THE USE OF STABILIZER IN RINDERPEST AND RANIKHET DISEASE VACCINE—NEW SCHEME, U.P.

Northern Regional Committee

There was no regionalisation involved in this scheme, and it was decided to refer to the Animal Diseases & Pests Committee, which should examine the technical aspects carefully. The author of the scheme should be invited to attend the meeting of the Animal Diseases & Pests Committee.

Animal Diseases & Pests Committee

The scheme was recommended for sanction subject to the following remarks :—

1. The technical programme should include only the following two items (i) to find out the extent to which the loss in titre during freeze drying can be reduced by incorporating stabilizers and (ii) the extent to which the life of the reconstituted goat tissue vaccine can be prolonged by incorporating stabilizers.

Q—HIDES AND SKINS

SUBJECT NO. Q-1

SCHEME OF RESEARCH ON THE MANUFACTURE OF "FAT-LIQUORS" FROM INDIGENOUS RAW MATERIALS FOR LEATHER PRODUCTION FROM INDIAN HIDES AND SKINS—EXTENSION PROPOSAL—CENTRAL LEATHER RESEARCH INSTITUTE, MADRAS

Regional Committees

Not considered.

Hides & Skins Committee

The Chairman referred to the encouraging results already obtained with fish oil and Pongam oil, and requested Dr. Nayudamma, Officiating Director, Central Leather Research Institute, Madras to explain the necessity of extension of the Scheme.

Dr. Nayudamma explained that, though good results had been obtained with Pongam oil and fish oil, sulphation of five or six more oils yet remained to be taken up. There was need for at least 3 different kinds of fat liquors, but so far substitute for only one of the imported liquors had been found. The physical and chemical characteristics of some more Indian vegetable oils, *viz.* linseed, mustard, yellow cleander seed etc. needed to be investigated.

Dr. Seetharamiah suggested that all the fat-liquors required in the country should be listed and only those fat-liquors should be prepared which were in demand.

The Chairman, while supporting the proposal for extension, remarked that the cost of production of the fat-liquors taken up for experimentation should compare favourably with that of the imported fat-liquors.

The Committee recommended the extension of the scheme for a period of three years, *i.e.*, up to the end of February, 1960. with the remark that the question of the production of fat-liquors from Pongam oil and fish oil on a commercial scale should be examined in consultation with the Council of Scientific and Industrial Research.

SUBJECT NO. Q-2

SCHEME OF RESEARCH ON THE MANUFACTURE OF CHROME RETAN LEATHER FROM COW HIDES FOR MILITARY PURPOSES—EXTENSION PROPOSAL, CENTRAL LEATHER RESEARCH INSTITUTE, MADRAS.

Regional Committees

Not considered.

Hides & Skins Committee

Dr. Nayudamma, while explaining the position regarding the extension proposal, stated that work under this scheme covered experimentation for obtaining good leather with proper thickness from poor hides required mostly for military purposes. This was achieved by the Chrome-Retan method. Dr. Nayudamma gave the Committee a brief outline of the process adopted. As a part of the future technical programme under the extension of the scheme, it was proposed to carry out tests to determine the physical characteristics, such as tensile strength, durability etc. of the retan leather.

The Committee recommended extension of the scheme for a period of 2 years on the existing basis.

1. The medium used for reconstitution in these experiments should be saline and saline plus stabilizers only.
2. Work on Ranikhet disease should not be carried out.
3. The duration of the scheme should be one year only.
4. The following staff was recommended for the scheme :—

(i) A. R. O.—1
(ii) R. A. (Veterinary)—
(iii) Laboratory Assistant—1
(iv) Laboratory Attendant—1
(v) Animal Attendants—2

5. Under contingencies the following allotments were recommended :—

(i) Provision for temporary sheds Rs. 2,000/-
(ii) Purchase of experimental animals Rs. 7,000/-
(iii) Feeding & maintenance of above Rs. 1,500/-
(iv) Chemical and apparatus Rs. 2,500/-

SUBJECT NO. Q-3

SCHEME FOR RESEARCH ON THE MANUFACTURE OF LEATHER BOARDS FROM LEATHER SHAVINAS WHICH ARE WASTE PRODUCTS OF TANNERIES—EXTENSION PROPOSAL —CENTRAL LEATHER RESEARCH INSTITUTE, MADRAS.

Regional Committees

Not considered.

Hides & Skins Committee

At the request of the Chairman, Dr. Nayudamma gave a detailed account of the research work so far done under the scheme and explained the work proposed to be done in the future. Under the future programme of work stress would be laid on the necessity of finding a suitable substitute for natural latex, the supplies of which were running short in India.

The Scheme was supported for extension for a further period of three years.

SUBJECT NO. Q-4

IMPROVEMENT OF QUALITY OF SHOE UPPER AND INDUSTRIAL LEATHER MANUFACTURED BY MINERAL TANNING

Regional Committees

Not considered.

Hides & Skins Committee

Dr. Nayudamma explained the entire position of the work under the scheme and stated that, while some work on chromium salts had already been done, yet a lot remained to be done and that salts o a few other metals still remained to be traced. Dr. Seetharamiah pointed out that scope of the scheme was too wide. The Committee was of the general opinion that concentrated work should be done by taking up only a few salts for the present.

After a thorough discussion of the possible future lines of work. the Committee recommended extension of the scheme for a further period of three years with the remark that research work might be concentrated mainly on chromium salts.

R.—Nil

S.—FISH AND FISHERIES

The schemes were not considered by any of the Committees.

T.—APICULTURE

SUBJECT NO. T-1

SCHEME FOR THE ESTABLISHMENT OF BEE-KEEPING RESEARCH CENTRE FOR NORTHERN REGION—NEW SCHEME, HIMACHAL PRADESH

Apiculture Committee

The Indian Council of Agricultural Research Secretariat informed the Committee that in spite of reminders, full details of the scheme had not been received from the Himachal Pradesh Government. The Committee felt that as the scheme was very important from the point of view of the progress and development of Bee-Keeping Research in India, the Indian Council of Agricultural Research should finance the whole of the expenditure of the scheme and locate it in the Punjab where it was functioning till 2 years ago. The scheme terminated in the Punjab as the Punjab Government did not agree to meet 50% of the expenditure. The Committee was of the view that the Indian Council of Agricultural Research should finance the whole expenditure.

SUBJECT NO. T-2

SCHEME FOR IMPROVING HONEY YIELD OF BEE-HIVES—NEW SCHEME, ANDHRA

Apiculture Committee

The Committee while accepting in principle the scheme, was of the opinion that it required redrafting specially the technical programme, as most of the items referred to the developmental aspects rather than to the research programme. The Committee therefore recommended that the scheme may be redrafted in the light of the discussion and sent back to the Committee for consideration

SUBJECT NO. T-3

SCHEME FOR CYTOGENETICAL AND HISTOCHEMICAL STUDIES ON THE MALE AND FEMALE GERM CELLS OF THE HONEY BEE—NEW SCHEME, PUNJAB UNIVERSITY

Apiculture Committee

The Committee discussed this scheme in great detail and was of the view that cytology and genetics should go together. So it was suggested that a coordinated scheme including cytology and genetics may be put up for consideration by the Committee.

U.—EDUCATION AND TRAINING

Not considered by any of the Committees.

V.—Nil

W.—AGRICULTURAL ECONOMICS

SUBJECT NO. W-1

STUDY OF MECHANISED FARMING—NEW SCHEME, BANARAS HINDU UNIVERSITY

The scheme was recommended by the Eastern Regional Committee.

The scheme was not recommended by the Agronomy Committee.

The Agricultural Engineering Committee recommended the scheme.

The Agricultural Economics Committee recommended the scheme but felt that it was necessary for the efficient conduct of the scheme that the investigators should be adequately trained and should have had experience of similar work. In order to attract suitable persons, the Committee recommended that a basic pay up to Rs. 250/- per month might be given to the right type of persons. The Committee further suggested that the data relating to previous years should also be secured as far as possible.

The Statistical Committee endorsed the recommendations of the Agricultural Economics Committee.

SUBJECT NO. W-2

THE STUDY OF ADVANTAGES AND ECONOMICS OF MECHANISED FARMING—NEW SCHEME, MADRAS

Southern and Coastal Regional Committee was of the view that in view of the policy of imposing ceilings on agricultural holdings. mechanisation of agriculture had no future in the country. Similar schemes had previously not been approved by the Indian Council of Agricultural Research.

It was noted by the Agronomy Committee that the Council had sanctioned a scheme at the Banaras Hindu University to collect information on the output and other relevant factors of mechanised and partially mechanised farms. They had also requested the Head of the Division of Agricultural Engineering, Indian Agricultural Research Institute, to prepare a pamphlet on the problem of mechanisation of agricultural operations in the country. In view of this, the Committee did not recommend the scheme.

The scheme was not acceptable to the Agricultural Engineering Committee in its present form. For the purpose of studying economics of mechanised cultivation, it is not considered necessary to build a garden factor for purchase of heavy machinery. If such equipment is already available in the Department of Agriculture, it can be used and cost of operation determined. If there are non-government farms of sufficiently large size working with tractors and power machinery near about Coimbatore, cost of operation and other details could be collected. If the scheme could be modified on the lines of the scheme submitted by the Banaras University, it could be considered by the Committee. A copy of the Banaras scheme may be sent to the Government of Madras.

Agricultural Economics Committee

In view of the decision of the Planning Commission that there was no need at present to make any study on the comparative merits of the two systems of farming *viz.* mechanisation versus bullock farming and that the information available on mechanised farming in the country might be collected from the various States and published, the Committee felt it difficult to recommend the scheme. The Committee, however, expressed the view that if a revised scheme were put up by the Government of Madras on the lines of the Banaras Hindu University scheme, confining its scope to collection of data pertaining to mechanised farming, the scheme might be favourably considered.

The Statistical Committee endorsed the recommendations of the Agricultural Economics Committee.

SUBJECT NO. W-3

COLLECTION OF DATA IN RESPECT OF PRODUCTION, CONSUMPTION, SURPLUS AND SURVEY OF ECONOMICS OF MILK IN THE TWIN CITIES OF HYDERABAD AND SECUNDRABAD—NEW SCHEME, INDIAN INSTITUTE OF ECONOMICS, HYDERABAD.

The scheme could not be considered by the Eastern Regional Committee (A.H.) in the absence of the detailed information which had been called for. It may be put up to Scientific Committee when the information becomes available.

In this connection, it was pointed out by the Southern Regional Committee that the scheme had been examined at an earlier meeting and the Dairy Science Committee found that certain additional details should be furnished by Hyderabad. These details were not yet received. The Director should supply them before the Dairy Science Committee examined the scheme further.

The *ad hoc* Milk Costing Committee did not support the scheme.

The Agricultural Economics Committee did not recommend the scheme.

The Dairy Science Committee felt that a survey of the existing milk supply conditions of Hyderabad and Secundrabad cities was necessary before establishing a milk scheme. The scheme was discussed in detail. The Committee were of the view that if the scheme was planned properly it was likely to give very useful results. But in the present form the aims and programmes of work were considered rather diffused. The Committee, therefore, suggested that the scheme might be redrawn in consultation with the Dairy Development Adviser to the Government of India.

The Statistical Committee felt that the subject was important, but the plan of the survey was very vague. A precisely planned programme which would yield reliable data would be necessary and the scheme should be accordingly revised.

SUBJECT NO. W-4

INVESTIGATION TO ASCERTAIN THE USE AND WASTAGE OF MAN AND CATTLE POWER IN THE PRODUCTION OF PRINCIPAL CROPS AND THE COST OF PRDUCTION OF SUCH CROPS—NEW SCHEME, WEST BENGAL

The Eastern Regional Committee observed that the scheme was very costly. If, however, the Scientific Committee was in favour of its being taken up, the number of centres should be reduced to one in each region. The Committee was also informed that Shri Chakravarthi who was to guide the scheme had retired from service. Unless some competent person was available, the Committee felt that there was no use in launching the scheme.

The Agricultural Economics Committee in endorsing the view of the Regional Committee was of the opinion that since this aspect of the matter would receive attention in the farm management survey which was being conducted in West Bengal under the Research Programme Committee of the Planning Commission, the project might be brought up for consideration later and the decision taken in the light of the results of the survey.

The Statistical Committee endorsed the recommendations of the Agricultural Economics Committee that the scheme should await the results of the farm management surveys conducted in West Bengal under the auspices of the Research Programme Committee of the Planning Commission.

SUBJECT NO. W-5

STUDIES IN COST OF RECLAMATION OF KALLAR (ALKALI) LANDS UNDER THE CANAL-CUM-TUBE WELL IRRIGATION, NEW SCHEME, KHALSA COLLEGE, AMRITSAR.

The Northern and Temperate Regional Committee did not recommend this scheme in its present form as similar type of work was being done at the Irrigation and Power Research Laboratory, Amritsar and the Department of Agriculture, Punjab, at Ludhiana. However, the Scientific Committee (Agronomy and Soil Science) should examine whether, in view of the work at Ludhiana and Amritsar, further work was necessary and if so, a revised scheme might be framed.

The Agronomy Committee noted that the work at Irrigation and Power Research Station, Amritsar and by the Department of Agriculture, Ludhiana did not cover these aspects of the problem of reclamation of Kallar lands. The Committee recommended that Dr. Daji, Assistant Agricultural Commissioner may be requested to visit Amritsar and recast the scheme in consultation with the Principal of the Khalsa College, Amritsar in order that proper information on the economics of reclamation is obtained from the scheme. It was suggested that the types of alkali lands at the College farm may be demarcated and depending upon the nature of the alkali soils. scheme of reclamation may be drawn up to work out the costs.

The Council do not sanction the allowance for the supervision of the scheme.

The modified scheme when received, may be recommended to the Advisory Board.

The Agricultural Economics Committee endorsed the recommendation of the Agronomy Committee.

The Soil Science Committee noted that the scheme was essentially intended to be a practical study in the application of known methods in restricted area and working out the related costs. The scheme was approved.

The Statistical Committee endorsed the recommendations of the Agronomy Committee.

SUBJECT NO. W-6

SURVEY OF FARM AND NON-FARM EMPLOYMENT IN SOUTH ARCOT DISTRICT—NEW SCHEME, ANNAMALAI UNIVERSITY

The Agricultural Economics Committee recommended the pilot survey.

The Statistical Committee endorsed the recommendations of the Agricultural Economics Committee that the procedural survey might be sanctioned, in the first instance, subject to the following remarks :—

(1) The object of the scheme should be clearly stated and the definition of farm and non-farm employment should be carefully made.

(2) Selective sampling should be replaced by random sampling.

SUBJECT NO. W-7

ENQUIRY INTO FACTORS INFLUENCING CROPPING PATTERN OF INDIVIDUAL FARM—MODEL SCHEME, INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Agricultural Economics Committee recommended that, after the scheme had been finalized by the Sub-committee, it should be placed before the Agricultural Economics Committee at is next meeting, and that the institutes which should be given financial assistance for conducting enquiries could then be selected by the

Committee. The Committee generally approved the predict and recommended that a lump-sum provision of Rs. 50,000/- should be made for this scheme pending detailed budgeting.

The Statistical Committee endorsed the recommendations of the Agricultural Economics Committee.

SUBJECT NO. W-8

STUDY OF ADOPTION OF IMPROVED PRACTICES ON DIFFERENT TYPES OF FARMS—MODEL SCHEME—I.C.A.R.

The Agricultural Economics Committee endorsed the views of the Sub-Committee and recommended that an alternative scheme on any other aspect of improved practices not necessarily mechanisation, should be prepared.

The Statistical Committee endorsed the recommendations of the Agricultural Economics Committee.

SUBJECT NO. W-9

SURVEY AND STUDY OF THE AGRICULTURAL CONDITIONS. PROBLEMS AND PRACTICES, NEW SCHEME, UTTAR PRADESH

The Northern and Temperate Regional Committe did not recommend the scheme as the proposed survey was a routine work undertaken by the States.

The Agronomy Committee did not recommend this sceme as it was felt that this should be a part of the routine work of the State Department concerned.

The Agricultural Economics Committee endorsed the recommendations of the Northern and Temperate Regional Committee.

The Statistical Committee endorsed the recommendations of the Northern and Temperate Regional Committee.

X.—STATISTICS

SUBJECT NO. X-1

EVOLVING OF A SUITABLE TECHNIQUE FOR ASCERTAINING COST OF MILK PRODUCTION (SECOND FIVE YEAR PLAN)—NEW SCHEME, INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The ad hoc *Milk Costing Committee* suggested that the scheme should include special emphasis on the question of :—

1. Fat production and its cost.
2. The calculation of cost of milk and fat production for cows and buffaloes separately.
3. Wholesale and retail prices in the Madras area.

The scheme and the technical programme may be revised and drawn up accordingly.

The Committee recommended that the scheme should be carried out with the above modifications.

The Dairy Science Committee discussed the scheme and endorsed the recommendations of the *Ad hoc* Milk Costing Committee. *The Statistical Committee* discussed the scheme at length.

A view was expressed as to whether the costing of milk production in rural area studied in isolation of farm economy would be proper.

The Chairman remarked that schemes with limited objectives should not be ruled out as otherwise the cost would be excessive for eaxmple, in the rural area even in the case of the cultivator producers, if costing of feed stuffs has to be done on the basis of their cost of production, it would make the scope of the scheme and its cost too large to manage. Also, it was not difficult to work out the appropriate components of cost of prduction of milk.

The Committee felt that there would be a considerable advantage in conducting the inquiry simultaneously in more than one area. The Committee recommended that the possibility of the provision for this purpose of the necessary additional funds and other facilities should be explored. With these remarks the Committee approved the proposal.

SUBJECT NO. X-2

STUDY OF MILK YIELDS, BREEDS AND MANAGEMENT PRACTICES OF BOVINES (SECOND FIVE YEAR PLAN)—EXTENSION—I.C.A.R.

The Animal Breeding Committee approved the scheme.

The Statistical Committee recommended the scheme.

SUBJECT NO. X-3

FURTHER INVESTIGATION ON THE TECHNIQUE OF SAMPLING OF FLEECES FOR ASSESSING WOOL QUALITY—NEW SCHEME, I.C.A.R.

The Statistical Committee recommended the scheme.

The Wool Committee—Dr. V. G. Panse, Statistical Adviser to the Council explained the work done under the scheme previously and the need for further investigation into the problem of sampling of fleeces both as regards the genetical work to be carried out at the Sheep Breeding Research Stations and also in evaluating quality for AGMARKING. The subject was discussed in detail and it was recommended that :—

The scheme was of fundamental importance in guiding the research workers at the experimental stations and also for standardizing the methods in AGMARKING. Hence the Committee recommended the sanction of the proposal.

SUBJECT NO. X-4

PILOT INVESTIGATION FOR STUDY OF CULTIVATION PRACTICES AND YIELDS OF PEPPER IN MADRAS AND TRAVANCORE-COCHIN, EXTENSION, INDIAN COUNCIL OF AGRICULTURAL RESEARCH

The Statistical Committee approved the scheme.

Y.--PUBLICATIONS AND PUBLICITY

SUBJECT NO. Y-1

PREPARATION OF MONOGRAPHS ON ALGAE, NEW SCHEME, I.C.A.R.

The proposal was approved subject to the deletion of the post of one Assistant Editor and one peon.

SUBJECT NO. Y-2

PREPARATION OF MONOGRAPHS ON DIFFERENT GROUPS OF FUNGI, NEW SCHEME, I.C.A.R.

The proposal was approved subject to the deletion of the post of one Assistant Editor, one U.D.C. and one peon.

SUBJECT NO. Y-3

PREPARATION OF MONOGRAPH ON AGRICULTURAL METEOROLOGY, NEW SCHEME, I.C.A.R.

The proposal was approved.

SUBJECT NO. Y-4

REPRINTING OF THE HANDBOOK ON "STATISTICAL METHODS FOR AGRICULTURAL WORKERS", NEW SCHEME. I.C.A.R.

The proposal was approved.

SUBJECT NO. Y-5

PROPOSAL TO TRANSLATE INTO SPANISH OF THE BOOK, "STATISTICAL METHODS FOR AGRICULTURAL WORKERS". NEW SCHEME, I.C.A.R.

The Committee agreed to the proposal.

SUBJECT NO. Y-6

SUPPLY OF AGRICULTURAL INFORMATION LITERATURE TO THE N.E.S. EXTENSION, I.C.A.R.

The proposal was approved.

SUBJECT NO. Y-7

PRINTING OF HINDI JOURNAL "KHETI"—EXTENSION, I.C.A.R.

The proposal was approved. Dr. Patel, however, requested to furnish information relating to the number of copies needed for the community project areas in Hindi speaking States. The total number of copies of Kheti to be printed would be decided thereafter.

SUBJECT NO. Y-8

BRINGING OUT OF I.C.A.R. PUBLICATIONS IN REGIONAL LANGUAGES, EXTENSION, I.C.A.R.

The Committee agreed to the proposal.

SUBJECT NO. Y-9

PUBLICATION OF A QUARTERLY POPULAR JOURNAL "INDIAN HORTICULTURE", NEW SCHEME, I.C.A.R.

The Committee approved of the proposal.

SUBJECT NO. Y-10

PREPARATION OF SUMMARIES IN ENGLISH AND HINDI OF THE MINISTRY'S CIRCULAR LETTERS FOR THE USE OF COMMUNITY PROJECTS AND N.E.S. BLOCKS, ADDITIONAL STAFF UNDER THE EDITOR'S SCHEME, NEW SCHEME. I.C.A.R.

The proposal was agreed to.

SUBJECT NO. Y-11

PUBLICATION OF A MONOGRAPH ENTITLED "RICE IN INDIA", NEW SCHEME I.C.A.R.

The proposal was agreed to. The Committee, however, recommended that the monograph should be reprinted and the cost involved in printing 5,000 copies should be worked out.

SUBJECT NOS. Y-12 & 13

12. PUBLICATION OF A QUARTERLY JOURNAL ON "AGRICULTURAL EDUCATION", NEW SCHEME, I.C.A.R.

13. FREE SUPPLY OF I.C.A.R. PUBLICATIONS TO THE VARIOUS AGRICULTURAL AND VETERINARY COLLEGES IN INDIA, NEW SCHEME, I.C.A.R.

Not considered by the Publications Committee.

SUBJECT NO. Y-14

PUBLICATION OF A MONOGRAPH ON "POULTRY" NEW SCHEME, I.C.A.R.

The Committee approved of the proposal. It however recommended that farm bulletins and pamplets should be produced from the material contained in each chapter of the monograph for wide dissemination of information contained therein.

SUBJECT NO. Y-15

PUBLICATION OF A MONOGRAPH ON "MANGO", NEW SCHEME, I.C.A.R.

The Committee agreed to the proposal.

SUBJECT NO. Y-16

CHANGE IN THE LAYOUT AND PRESENTATION OF MATERIAL IN THE "RICE NEWS TELLER" AND FIXATION OF ITS PRICE—ADDITIONAL GRANT, I.C.A.R.

The Committee approved of the changes in the layout and presentation of the material proposed to be printed in the Rice News Teller. It also approved that the Hindi translation of the Journal should be issued as a separate magazine in the name of "Chawal Samachar". The journal will be supplied free to approved research workers. In addition to this, they will be also available for sale.

APPENDIX IV

Proceedings of the Joint Meeting of the Board of Research and the Board of Extension held at New Delhi on Wednesday, the 21st November, 1956

The following were present :—

1. Dr. M. S. Randhawa, I.C.S. (Chairman).
2. Dr. B. N. Uppal, Agricultural Commissioner with the Government of India.
3. Dr. B. P. Pal, Director, I.A.R.I.
4. Dr. V. G. Panse, Statistical Adviser, I.C.A.R.
5. Dr. T. J. Mirchandani, Director, Scil Sonservation. Damodar Vallery Corporation.
6. Dr. E. S. Narayanan, I.A.R.I.
7. Dr. R. S. Vasudeva, I.A.R.I.
8. Dr. K. C. Sen, Director, National Dairy Research Institute.
9. Shri S. S. Khot, Special Officer, (Sheep & Wool), I.C.A.R.
10. Shri S. G. Iyer, I.V.R.I.
11. Dr. B. L. Sethi, Secretary, Indian Central Cotton Committee.
12. Dr. R. S. Sankaran, Secretary, Indian Central Oilseeds Committee.
13. Dr. Pushkar Nath, Director, C.P.R.I.
14. Dr. P. J. Gregory, Secretary, India Central Coconut Committee.
15. Shri Pritam Singh, Secretary, Indian Lac Cess Committee.
16. Dr. L. C. Sikka, Dairy Development Adviser to the Government of India.
17. Shri J. V. A. Nehemiah, Secretary, I.C.A.R.
18. Shri S. K. Mirchandani, Additional Secretary, I.C.A.R.

OFFICERS OF THE COUNCIL AND VISITORS

1. Dr. P. Bhattacharya, I.V.R.I.
2. Dr. R. J. Kalamar, Additional Agricultural Commissioner with the Government of India.
3. Dr. S. Dutta, Director, Veterinary Services, West Bengal.
4. Shri M. U. S. Jang, Deputy Agricultural Commissioner with the Government of India.
5. Shri K. P. R. Kartha, Deputy Livestock Adviser with the Government of India.
6. Shri D. N. Singh, Deputy Agricultural Extension Commissioner, Directorate of Extension and Training.
7. Shri M. R. Mahajan, Secretary, C.R.P.C., I.C.A.R.
8. Shri P. L. Malhotra, Under Secretary, I.C.A.R.
9. Dr. Sham Singh, Assistant Agricultural Commissioner with the Government of India.
10. J. A. Daji, Assistant Agricultural Commissioner with the Government of India.

11. Dr. U. N. Chatterji, Editor, I.C.A.R.
12. Shri F. C. Mehrota, Chief Superintendent, I.C.A.R.
13. Shri V. N. Amble, Statistician, I.C.A.R.

In opening the meeting, the Chairman said that this was the first meeting in which the members of the Board of Research, the Board of Extension, the Directors of the Central Research Institutes, and Representatives of the Central Commodity Committees had joined together to consider the various matters concerning agricultural research and development. His object in bringing together the various interests concerned was to ensure proper co-ordination and quicken the pace of practical development. He had noticed that several important results achieved long ago had not yet been adopted by the farmers, as for instance, the farmers in general were not yet aware of the value of feeding the cattle with rice straw after it had been washed. His intention was that the results of practical value which were obtained under the various schemes whether conducted under the auspices of the I.C.A.R. or of the Central Commodity Committees or the Central Research Institutes should be brought together and passed on to the 'Extension Agencies' in the Community Projects and the National Extension Service Blocks so that they could reach the farmers as quickly as possible. All these results would be classified in two categories, *viz.* (i) those which could be passed on to scientific workers in the field of research and extension and (ii) those which could be passed on to the village level workers and progressive farmers for adoption on the field.

The Chairman added that this idea was to split up the enlarged Board in two bodies—one consisting of the Directors of the Central Research Institutes and research institutes under the Central Commodity Committees and other Technical Experts and the other consisting of the Secretaries of the Commodity Committees and other officers incharge of administrative and executive functions connected with agricultural research and extension and policy matters. These two bodies should meet separately a couple of months in advance of the meetings of the Board and their recommendations placed before the full Board and the Advisory Board in due course. The Chairman also said that in future the Board should meet for two or three days to be able to devote proper attention to all matters on the Agenda.

The Chairman further suggested that the Central Commodity Committee should form Agricultural Extension Sub-Committees for sorting out the results of research which should be brought to the notice of the farmers, for devising ways and means to encourage the adoption of results of research into practice and for collecting information regarding the acreage of various crops under improved seeds. The State Governments also should be requested to set up similar Sub-Committees to attend to these items of work and also to arrange for multiplication of improved seeds and their supply to the farmers. The Directorate of N.S.S. should also be requested for collecting information regarding the acreage of various crops under improved seeds in the course of their surveys. The information collected by these Sub-Committees should be submitted to this Board in due course.

The Chairman also said that it was a matter of great importance that important results of researches already undertaken by the I.C.A.R., the Central Commodity Committees, the Central Research Institutes etc. should be collected and compiled subjectwise, cropwise, and statewise and published in the form of a booklet. Results achieved hereafter should also be compiled annually. The State Governments should also be requested to collect similar information in respect of researches conducted in their institutions. All these results after consolidation should be circulated to the Directors of Agriculture, Agricultural Colleges, Community Projects Administration and other interested bodies and persons.

The chairman then took up the various items on the Agenda one by one.

A : 1 Action taken on the general recommendations made by the Boards of Research and Extension at their meetings held in January, 1956.

The Board noted the action taken on the general recommendations made by the Boards of Research and Extension at their meetings held in January, 1956. In this connection the Board recommended:

(i) that the Central Sugarcane Committee should be requested to expedite the preparation of the monograph on diseases on sugarcane in India (*vide* item (I) of the note).

(ii) that the State Governments should be requested to furnish information regarding the area under improved varieties of food grains as early as possible and that the Directorate of N.S.S. should also be asked to collect this information in the course of their crop cutting surveys (*vide* item (3) of the note).

(iii) that the Governments of Assam and Punjab should be requested to take early action for the establishment of animal nutrition units in their States (*vide* item (12) of the note).

A : 2 General recommendations made by the Scientific and Commodity Committees at their meetings held in April and October, 1956.

The Board endorsed the observations made by the Working Parties on Agriculture and Animal Husbandry (*vide* Annexures I & II) on the general recommendations made by the Scientific and Commodity Committees at their meetings held in April and October, 1956.

A : 3. Observations made by the Scientific and Commodity Committees at their meetings held in October, 1956, on the new schemes and proposals for the continuance of current schemes listed under Sections B to Y.

The Board endorsed the recommendations made by the Working Parties on Agriculture and Animal Husbandry (*vide* Annexures I & II) regarding the various new schemes and proposals for the continuance of current schemes included in Sections 'B' to 'Y'.

A : 4. Preparation of a priority list in respect of the new schemes recommended for sanction.

The Agricultural Commissioner said that scheme No. C-6 should be added under Priority 'A' after scheme No. C. 2.

Subject to the addition mentioned above the endorsed the recommendations of the Working Parties on Agriculture and Animal Husbandry (*vide* Annexures I & II) to the effect :—

(i) that the extension of current schemes recommended for continuance should receive the first priority for finance ; and

(ii) that the new schemes should be financed in the order of priority recommended by the Working Parties.

A : 5. Notes on policy matters suggested by the Members of the Advisory Board.

Nil.

A : 6. Preparation of review notes for consideration by the Advisory Board on the various agricultural and animal husbandry subjects, *i.e.* on

(i) Problems on which research work has been completed and the results thereof can be passed on to Extension Workers,

(ii) Problems on which research work is already in progress but requires intensification, and

(iii) New problems on which research should be initiated.

AGRONOMY.—The Agricultural Commissioner said that the first paragraph under 'Agronomy' on page 5 of Annexure I should be transferred to page 9 of that Annexure before the item 'Agricultural Engineering'.

The Chairman mentioned that the Chinese had evolved specific system for the planting of crops in squares, hexagons, etc. after studying the merits of different methods. He suggested that the Chairman of each Commodity Committee should consider this matter and put up a note in this connection for consideration in due course

SOIL SCIENCE.—Dr. B. P. Pal informed that experiments for evolving suitable soil-testing kits were in progress and that the question of mass production of these kits in India would be taken up as soon as these kits had been standardised. The Chairman said that the results of these experiments should be passed on to the Community Projects Administration in due course.

DAIRYING.—The Chairman mentioned that Shri Parikh, Vice-President, Indian Central Cotton Committee had informed him that he was keping raw milk in unsterilized form in bottles for several months. He suggested that the Director of the National Dairy Research Institute should see Shri Parikh and try to study the method by which milk could be kept for long periods without being spoiled.

ANIMAL NUTRITION.—The Chairman suggested that a recommendation should be made to the State Government to encourage the planting of those trees in forest areas the leaves of which were useful as cattle feed, in case this had not already been done.

GENERAL.—The Chairman suggested that a complete list of schemes which had been recommended for intensified work and items on which future work had been suggested to be taken up should be printed and circulated to the Agricultural Colleges, Agricultural Libraries, Development Commissioners, the Community Projects Administration and other 'Extension Agencies' for wide publicity. This list should also be published in 'Kurukshetra' and 'Gram Sevak'.

The Board endorsed the recommendatons made by the Working parties on Agriculture and Animal Husbandry (*vide* Annexures I & II), subject to the above suggestions.

A : 7. Preparation of notes on policy matters pertaining to agriculture and animal husbandry research and extension work for consideration by the Advisory Board.

The Board endorsed the recommendations made by the Working Parties on Agriculture and Animal Husbandry *vide* Annexures I & II).

Dr. Dutta, Director of Veterinary Services, West Bengal stated that difficulty was felt in finding funds for undertaking new items of research not included in the Second Five-Year Plan. The Chairman said that the details of such schemes should be communicated to the Indian Council of Agricultural Research to enable it to take up the matter with the Planning Commission.

A :8. Control and treatment of surra and bovines and equines —New Scheme, Madras.

The Board endorsed the recommendations made by the Working Party on Agriculture, (*vide* Annexure II).

A : 8 A. Exploitation of inventions by the National Research Development Corporation-General agreement with the Government for apportionment of premia and exploitation of patents.

The Board endorsed the recommendations made by the Working Party on Agriculture, (*vide* Annexure I.)

A : 8 B. Co-ordination of research on Animal Husbandry-Appointment of staff for scrutinising reports, Programmes, etc., from State Governments, Commodity Committees, Central Institutions, etc.

The Board endorsed the recommendations made by the Working Party on Animal Husbandry ,*vide* Annexure II).

On completion of the items on the Agenda, the Chairman informed the Board of the following observations made by the Chinese Mission in the course of their meeting with the officers of the Ministry of Agriculture, Government of India :—

(i) In view of the advantages of the square system of planting paddy, spacing experiments should be undertaken to find out what was the best method of planting different crops *i.e.*, what distance should be allowed between the plants and between the rows. The most suitable method should be advocated for adoption, particularly in small holdings where manual labour and bullock-drawn implements were used. The Agricultural Engineering Departments should also be addressed to devise some drills by means of which proper lines could be marked for sowing seeds.

(ii) The pits by the side of the railway lines should be used for cultivating deep water paddy. For this purpose it should be found out what type of seeds, would be most suitable for these pits.

(iii) The system of tank irrigation used in Mysore was very suitable and should be adopted where possible.

(iv) The farmers should be encouraged to take up double cropping of paddy and for this purpose any legislation that was considered necessary might be enacted.

(v) Much more water seemed to be given to paddy crop than was really necessary. (This observation might be due to a visit to rain-fed areas).

(vi) The 'ridge' type of cultivation should be adopted, where possible. It prevented lodging of the rice crop and facilitated draining of excess water.

(vii) The system of withdrawing water at intervals and giving irrigation after a few days enabled the plants to go deeper into the soil. This method could be adopted in hilly areas.

(viii) In China, human organic wastes were used as manure, as a regular measure. A survey should be made to find out where and how these organic wastes which were not utilised at present could be utilised in our country.

(ix) Research Workers should be encouraged to come to closer contact with the farmers. At times they should live with the latter, find out the cultivation processes adopted by them and help them in improving those processes by suggesting better and higher-yielding methods, and

(x) One of the reasons why improved agricultural implements were not popular was their high cost. The farmers should therefore, be given improved implements on loan and their cost should be recovered within a period of say five years according to hire-purchase system.

ANNEXURE I

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Proceedings of the meeting of the Working Party on Agriculture of the Board of Research, Indian Council of Agricultural Research, held on the 19th and 20th November, 1956

The following were present:—

MEMBERS

1. Dr. B. N. Uppal, Agricultural Commissioner with the Govt. of India—(*Chairman*).
2. Dr. R. J. Kalamkar, Additional Agricultural Commissioner with the Government of India.
3. Dr. B. P. Pal, Director, I. A. R. I., New Delhi.
4. Dr. V. G. Panse, Statistical Adviser, I.C.A.R.
5. Dr. Pushkar Nath, Director, C.P.R.I., Simla.
6. Dr. V. Subrahmanyan, Director, C.F.T.R.I., Mysore.
7. Dr. R. S. Vasudeva, Head of the Division of Mycology, I.A.R.I., New Delhi.
8. Dr. E. S. Narayanan, Head of the Division of Entomology. I.A.R.I., New Delhi.
9. Dr. T. J. Mirchandani, Director, Soil Conservation Deptt., Damodar Valley Corporation, Bihar.
10. Dr. B. L. Sethi, Secretary, I.C.C.C., Bombay.
11. Dr. P. J. Gregory, Secretary, I.C. Coconut Committee, Ernakulam.
12. Dr. R. Sankaran, Secretary, I.C.O.C., Hyderbad-Dn.
13. Shri Pritam Singh. Secretary, I.L.C.C., Ranchi.
14. Shri D. N. Singh, Deputy Agricultural Extension Comissioner.
15. Shri M. U. S. Jung, Deputy Agricultural Commissioner.
16. Dr. Sham Singh, Astt. Agricultural Commissioner.
17. Dr. J. A. Daji, Asstt. Agricultural Commissioner.
18. Shri M. R. Pannikar Research Officer, I.C.A.R.

A—General

ITEM No. 2—*General recommendations made by the Scientific and Commodity Committees at their meetings held in April and October,* 1956.

The Working Party endorsed the general recommendations of the Scientific and Foodgrains Committees with the following observations and modifications :—

Horticulture

(i) The Working Party recognized that the problem of estimating the area and production of fruits and vegetables was important one, but considered that a separate scheme should be framed for developing a technique for estimation of the area and production of these crops. The Committee further recommended that, if this work was entrusted to the staff provided under the Horticultural Development Scheme, it would not be possible to get the work done without seriously affecting the progress of development work under the scheme.

(ii) The Working Party recognized the importance of the mango malformation disease, but was not in favour of conducting any survey of this disease. It was, however, recommended that investigation into this disease should be intensified.

As regards the decline of citrus trees, the Indian Council of Agricultural Research has already sanctioned a co-ordinated scheme for investigation into this disease, with the main station at the Indian Agricultural Research Institute and two regional stations, one in the Bombay State and the other in Coorg in the Mysore State.

J.—Entomology

The general recommendation made by the Entomology Committee should be modified to read as under :—

> "The Committee felt that in the first instance research work on mites and aphids should be intensified."

ITEM No. 3—*Observations made by the Scientific and Commodity Committees at their meetings held in October,* 1956, *on the new schemes and proopsals for the continuance of current schemes listed under Section B to Y with the remarks of the Boards of Research and Extension thereon.*

The Working Party endorsed the recommendations of the Scientific and Foodgrains Committees in connection with the new schemes and proposals for the continuance of current schemes relating to agriculture.

ITEM No. 4—*Preparation of a priority list in respect of new schemes recommended for sanction.*

The Working Party on Agriculture fixed the following priorities :—

PRIORITY A

B-2, B-6, B-7, B-9, B-11, B-16, B-17, B-19, B-20 to B-24 and B-26.
C-2, C-11, C-17, C-20, C-28.
All D Schemes except D-1.
E-1, E-2, E-4.
All F Schemes except F-11.
All G Schemes.
All H Schemes except K-15 which is a note.
I-3, I-4 and I-5.
J-1, J-11, J-12, J-14, J-19.
K-1, K-2, K-7, K-16, K-18.
L-1.
W-1, W-5 to W-7.
X-1, X-4.
All Y Schemes except Y-12, Y-13.

PRIORITY B

B-4, B-10.
C-12.
D-1
F-11.

ITEM No. 6—*Review notes by the Boards of Research and Extension on the various agricultural subjects.*

(a) Problems on which research work has been completed and the results thereof can be passed on to Extension Workers for general adoption.

Horticulture

In Kerala two high-yielding hybrids of tapioca, namely, H-96 and H-105 have been evolved. Two promising selections of tapioca, namely M-4 and M-6 are available for distribution.

In the investigations carried out at the Central Banana Research Station, Aduthurai (Madras), it has been found that in the case of *Monthan* variety of banana, it is preferable not to cut the pseudostem completely or to cut it about half its height from the ground after harvest to cutting it completely at the ground level.

Pusa Ruby (Hybrid 10) has given high yields of luscious red tomatoes at the Indian Agricultural Research Institute, New Delhi.

In Wynaad (Malabar), mandarin orange trees, when manured and properly mulched, were able to withstand drought better than when these trees were given other treatments such as :—

(a) digging round the plants twice a year.
(b) mulching the trees only.
(c) growing a cover crop in the garden,
(d) digging round the trees twice a year and manuring them, and
(e) cutting down weed growth in the garden.

Introduction of seedless varieties of mandarin orange should be encouraged in order to find out whether these varieties can be profitably grown under Indian conditions to meet the requirements of the canning industry.

Plant Diseases.

"Katten disease has been causing serious losses in cardamom plantations for many years past. The disease has been successfully controlled in the Bombay State by the eradication of diseased plants and rehabilitating the gardens by transplanting disease-free seedlings. As the disease is carried from infected to healthy plants by the banana aphid, it is necessary to ensure, after the diseased plants have been removed from the garden, that no healthy seedings are transplanted for a period of six months to a year.

Entomology

Spraying with Endrin at the rate of 4 oz. in 100 gallons of water per acre controls the mustard aphid effectively.

One part of Pyrethrum extract containing 2 to 3 per cent pyrethrins in 800 parts of water also gives an effective control of the mustard aphid. The quantity of the pyrethrum spray required for an acre of the crop is 60 to 100 gallons depending upon the degree of infestation.

Dusting of the paddy crop with 5 per cent BHC at the rate of 15 to 20 lbs. of the dust per acre controls paddy thrips. Similar results can also be obtained if the crop is sprayed with 0·1 per cent to 0·2 per cent wettable BHC at the rate of 40 to 60 gallons per acre.

Fumigation of cotton seeds infected with pink bollworm at the rate of 1 lb. per 1000 c. ft. of seeds volume will render the seed free of insect infestation.

Botany

N.P. 799 and N. P. 798 wheat strains are recommended for general cultivation in North Bihar and in the Halar district of Saurashtra respectively.

Some of the promising cotton strains which have recently been evolved are given as under :—

(i) *Daulat* for cultivation in the Gaorani area of the Andhra State to replace Gaorani 12 cotton.

(ii) Indo-American strains 170-Co. 2 and 134-Co. 2 are two important hybrids which have already covered over 2½ lakh acres in the Banaskantha and Kaira districts in Gujerat in the Bombay State.

(iii) H. 14 is an American cotton evolved in the Punjab to replace 216F. This strain is early maturing, and gives higher yield and has a better spinning quality than 216F.

(iv) MCU. 2 is another American strain which has proved very suitable for growing under irrigated conditions in the Madras State.

Agronomy

Methods of foliar application of fertilisers to cash crops such as sugarcane, tobacco, potatoes and cotton based on foliar diagonosis should be worked out.

The produce of the first crop of potatoes harvested in December-January in the plains should be stored in cold stores for use as seed as this produce is relatively free from virus infection.

Methods of breaking dormancy in potatoes have successfully been worked out and should be applied on a commercial scale. A pilot project should be undertaken at Simla for treatment of seed potatoes harvested in the month of September.

Statistics

The sampling technique for crop estimation has been demonstrated to bring about a substantial improvement in production statistics of food crops, and it is recommended that those States which have not adopted this technique so far should do so immediately.

(b) Problems on which research work is already in progress but requires intensification.

Horticulture

Work is necessary in regard to the important fruits of the country to describe the type in the case of each commercial variety. If this is done, it will enable those interested in fruit growing to pick out the genuine varieties for propagation and to discard the numerous variants in the commercial varieties found throughout the country.

Researches should be initiated with the object of not only exploiting the genetic variability already available in the fruit trees but also to add to that variability by enducing mutations by creating polyploidy, etc.

Soil Science

Research on the reclamation of saline and alkaline lands should be strengthened, and a co-ordinated programme of research work should be prepared for the whole country.

Methods of foliar application of fertilisers to fruit crops based on foliar diagnosis should be worked out.

Research on soil structure in relation to soil fertility should be strengthened.

The role of levels of organic matter in the soil in relation to crop response to mineral fertilisers should be carefully investigated at two or three selected centres where adequate facilities for such investigations exist. These investigations are necessary with a view to elucidating the part which the organic matter plays in maintaining the soil fertility under conditions of continuous application of chemical fertilisers.

Plant Diseases

Work on malformation of mango and decline of citrus trees should be intensified.

Blackarm disease of cotton is assuming serious proportions in the Dharwar-Gadag areas of the Bombay State and in other American cotton growing areas in South India. It is necessary to intensify investigation into the physiologic specialisation of the organism with a view to ascertaining whether there are more than one strain, and to standardise grades of resistance to blackarm to serve as an aid in evolving disease—resistant strains.

The work on the root rot disease of coconut which is probably of virus origin, should be intensified with the held of the staff under the plant virus scheme at the Indian Agricultural Research Institute.

Entomology

Considerable amount of work has been done on the production of cotton varieties resistant to jassids, but no satisfactory control of the pest has so far been worked out. It was considered necessary that the work on the control of jassids by the use of suitable insecticides should be undertaken.

Botany

In breeding improved varieties of crops the plant breeder should aim at evolving new varieties suitable for growing under high soil fertility conditions, particularly if these varieties are to be grown under conditions of high manuring and irrigation.

Work on hybrid vigour in sorghum, both for grain and fodder, should be intensified particularly in areas where sorghum is an important millet crop.

Work on the production of hybrid seed from *hirsutum* and *barbadense* cottons should be pursued with vigour as this work has got great economic potentialities for the country.

Work on the breeding of extra-long staple cotton of 1·3/16″ staple and above and capable of spinning 60's and above should be intensified as this work is also very important with a view to making the country self-sufficient in its requirement of long staple cotton which at present is costing the country over Rs. 25 crores annually.

Work on the evolution of dorment strains of groundnut (*i.e.*, strains of which the seed do not sprout immediately at maturity) for cultivation in areas where rains are generally received at harvest time.

Agronomy

The scope of the Model Agronomic Experiments scheme should be enlarged by the inclusion of an oilseeds crop in addition to the five crops already included in the scheme. The oilseeds crop to be selected should be one which is predominently grown in the region in which the centre is located.

Agricultural Engineering

The scope of the survey of indigenous agricultural implements should be extended to include such agricultural implements and machinery, either hand-operated or bullock-drawn, as are not included in the present survey, namely, water lifts, chaff cutter, sugarcane crushers, groundnut decorticator, rice processing equipment, flour mills and oil ghanis and threshing devices.

Statistics

Pilot surveys which are in progress for studying fertiliser use have given valuable data. It is necessary to take up similar surveys on other crop cultivation practices on a country-wide scale as these surveys will furnish information which will be of considerable value in planning development work.

(c) New problems on which research should be initiated.

Horticulture

Trials on the use of artificial light, temperature and humidity under controlled conditions with a view to controlling flowering in selected ornamental plants should be conducted.

Plant Diseases.

Root-rot disease of apple in Himachal Pradesh is becoming very serious and is causing considerable anxiety to apple growers. The cause of this disease should be investigated, and suitable remedy measures devised.

Research on namotodes should be intensified.

Entomology

Research on namotodes and mites should be intensified.

Agricultural Engineering

Research on the evolution of suitable agricultural implements for reducing the cost of cultivation of cotton should be initiated.

Statistics

A sampling technique for estimating the area and production of fruit and vegetable crops was necessary and a suitable scheme for this purpose should be prepared.

A sampling technique for estimating the production of lac should also be evolved.

ITEM No. 7—*Notes on policy matters pertaining to agricultural and animal husbandry research and extension work prepared by the Boards of Research and Extension.*

This item is covered by Item No. A-6.

ITEM No. 8 (A)—*Exploitation of inventions by the National Research Development Corporation—General agreement with the Government for apportionment of premia and exploitation of patents.*

The Working Party on Agriculture agreed to the sharing of gross earnings from the premia and royalties between the National Research Development Corporation and Government in the proportion of 80 per cent and 70 per cent of the earnings. The share of 70 cent of the earnings to be paid to Government should be divided between the Government and investor/inventors in the ratio of 60 per cent to the inventor and 40 per cent to the Government. The inventor's share of the gross earnings from the royalties should be increased with subsequent improvements in the invention in order to keep his interest alive.

ANNEXURE II

Proceedings of the Working Party Meeting on Animal Husbandry held in I.C.A.R. on 19th and 20th November, 1956.

The following were present :—

MEMBERS

1. Dr. L. C. Sikha, Dairy Development Adviser, Government of India—(*Chairman*).
2. Dr. K. C. Sen, Director, National Dairy Research Institute, Karnal.
3. Dr. N. D. Kehar, Head of the Division of Animal Nutrition, Indian Veterinary Research Institute, Izatnagar.
4. Shri S. G. Iyer, Head of the Division of Poultry, Indian Veterinary Research Institute, Izatnagar.
5. Shri P. Bhattacharya, Head of the Division of Animal Genetics, Indian Veterinary Research Institute, Izatnagar.
6. Dr. K. K. Iya, National Dairy Research Institute, Karnal.
7. Dr. S. Dutta, Director of Veterinary Services, West Bengal, Calcutta.
8. Shri K. P. R. Kartha, Deputy Divestock Adviser, Indian Council of Agricultural Research.
9. Shri M. R. Mahajan, Secretary, Central Rinderpest Control Committee.
10. Shri S. S. Khot, Liaison Officer, Sheep & Wool, Indian Council of Agricultural Research.
11. Shri V. N. Amble, Statistician (A. H.), Indian Council of Agricultural Research.

A—GENERAL

A-1.—Action taken on the general recommendations made by the Boards of Research and the Advisory Board at their meetings held in January, 1956.

Noted.

A-2.—General recommendations made by the Scientific and Commodity Committees at their meetings held in April and October, 1956.

The recommendations made by the Scientific and Commodity Committees were considered. With regard to the suggestion for the appointment of an Animal Nutrition Adviser, the Party felt that the Indian Council of Agricultural Research might consider the question of appointment of senior specialists in different branches of Animal Husbandry to assist the Animal Husbandry Commissioner.

A-3.—Observations made by the Scientific and Commodity Committees at their meetings held in October, 1956, *on the new schemes and proposals for the continuance of current schemes listed under Sections B to Y.*

The Party endorsed the observations made by the Scientific and Commodity meetings at their meetings held in October, 1956 on the new schemes and proposals for the continuance of current schemes listed under Sections B to Y.

A-4.—Preparation of a priority list in respect of the new schemes recommended for sanction.

The priority list prepared by the Party is given below :—

M.—ANIMAL BREEDING

M (a) CATTLE

M. 6, M. 3, M. 4, M. 1, M. 8, M. 10,
M. 13, M. 12, M. 14, M. 18, M. 2, M. 19.
M. 18, M. 7, M. 15, M. 9,

M (b) SHEEP AND WOOL

M. 27, M. 25, M. 26,

M (c) GOAT

M. 29,

M (d) POULTRY AND DUCK

M. 32, M. 31, M. 33,

M (e) OTHER LIVESTOCK

M. 41, M. 40, M. 39, M. 38,

N.—ANIMAL NUTRITION

N. 3, N. 4, N. 2, N. 7, N. 5, N. 6,
N. 9.

O.—DAIRY SCIENCE

O. 2 , O. 3 , O. 4 , O. 5

P.—ANIMAL DISEASES

P. 9 , P. 16 , P. 14 , P. 13 , P. 6
P. 7 , P. 8 , P. 12 , P. 15

S.—FISHERIES

S. 1 ,

T.—APICULTURE

T. 1 , T. 2 , T. 3 ,

X.—STATISTICS

X. 1 , X. 3

Y.—PUBLICATIONS AND PUBLICITY

Y. 14 , Y. 10 , Y. 4 , Y. 5

A-5.—*Notes on policy matters suggested by the members of the Advisory Board.*

Not received.

A-6.—*Preparation of review notes for consideration by the Advisory Board on the various agricultural and animal husbandry subjects i.e. on*

(1) Problems on which research work has been completed and the results thereof can be passed on to Extension Workers.

(2) Problems on which research work is already in progress but requires intensification, and

(3) New problems on which research should be initiated.

The Party reviewed the notes prepared by the Chairman of the various Animal Husbandry Scientific Committees. A revised consolidated note is enclosed.

A-7.—Preparation of notes on policy matters pertaining to agricultural and animal husbandry research and extension work for consideration by the Advisory Board.

General Recommendations

1. The party reviewed the working of the Regional Committees and felt that the objectives with which the Committees were set up would be better realised if :—

(a) research projects were, in fact, regionalized, and

(b) research workers employed in the regions were associated with the meetings of the Committee.

2. The Committee felt concerned with the view taken by the authorities that allotments of funds for new research projects, outside the Plan, would not be made. They, therefore, felt that the Indian Council of Agricultural Research should take immediate steps to ensure that implementations of research schemes did not suffer for this reason during the current Plan Period.

3. The party noted that the progress of certain important projects had suffered due to frequent changes of the speclialist staff on grounds of promotion and prospects and recommended that the Indian Council of Agricultural Research might consider ways and means of finding a solution of this problem so that the specialised knowledge and experience of the trained workers might remain available to the scheme.

4. The Working Party considered the important problem that had arisen *vis-a-vis* the present position of milk breeds as a result of partition of the country and felt that to meet the specialised requirements of large consuming centre cows of special dairy breeds such a Sahiwal, Red Sindhi and Tharparkar would be essential. A limited number of animals of these breeds was available in the country and it was necessary not merely to conserve them. but also to multiply them on a large scale. In view of the national importance of the subject, the Working Party suggested that a Special Committee should be set up to consider this problem in all its aspects.

A-8.—Control and treatment of surra and bovines and equines. New Scheme, Madras.

The Party considered the question raised by the Southern Regional Committee as to how the cost of treatment, when it was high, should be met. Apart from the particular disease under consideration, the Party thought that there was likely to be two kinds of treatment :—

(1) control of diseases of local importance, and

(2) control of diseases of all India importance.

The Party was of the view that in the first case it should be the responsibility of the State Government concerned to meet the expenditure but in the second case, the Government of India should bear the entire cost in the initial stages. Such expenditure should. however be restricted to only such diseases where risk for their spread to different parts of country was great. such as in the case of Foot and Mouth disease, Rinderpest etc.

A-8 (A).—Exploitation of inventions by the National Research Development Corporation—General agreement with the Government for appointment of premia and exploitation of patents.

Noted.

A-8 (B).—Co-ordination of research on Animal Husbandry. appointment of staff for scrutinising reports, programme etc. from State Governments and Commodity Committees and Central Institutions etc.

The party felt that the staff proposed was not likely to prove equal to the task expected of it. The subject of animal husbandry was very vast and it would not be possible for one junior Class I Officer. however qualified he might be to do full justice to all branches. The appointment of Junior Technical Assistants too. was not likely to improve the position. The Party, therefore, suggested that their recommendation regarding the appointment of senior specialists to assist the Animal Husbandry Commissioner was likely to prove more useful and might, therefore, be considered.

APPENDIX V

Review notes by the Boards of Research and Extension on the various agricultural and animal husbandry subjects

(1) REVIEW NOTE ON AGRONOMY

BY

Dr. T. J. Mirchandani.

I. Problems on which research has been completed and the results which can be passed on the Extension Workers through the Board of Extension for general adoption

No scheme reached the concluding stage of its work, therefore, no definite recommendation can be passed on to the cultivators.

Some useful results appear to be in sight from the Weed Control Schemes at Coimbatore, Madras and at the Bose Institute, Calcutta. Similarly, report on the Madhya Pradesh Fodder Scheme showed some interesting results on the introduction of fodder crops as catch crops and on their manuring and adaptibility.

These, however, need confirmation before they are ready for issue.

II. Problems on which research work is already in progress and requires intensification.

It is suggested that work in the Model Agronomic Experiment Scheme should be intensified by an expansion in its programme—in particular on water requirement of crops. A Chemical Assistant, to study the moisture regime in these experiments, will be very useful where such assistance is not readily available from the States. The expansion of the programme may require additional area at each centre. When the sanctioned number of centres have started functioning increase in the number of centres may also be considered. This is one of the most important schemes of co-ordinated work in agronomy and will yield results of practical value regionwise in the shortest time.

Another item which need intensification is the fitting in of a short season fodder crop in the usual rotations whenever this is found feasible.

III. New problems on which research should be initiated

It is suggested that the studies in foliar diagonsis in relation to plant nutrition may be taken up in one or two research stations.

(2) REVIEW NOTE ON BOTANY

BY

DR. B. P. PAL

(1) *Problems on which research work has been completed and the results obtained therefrom can now be passed on to the extension workers for general adoption*

The improved varieties of the following crops can be recommended to the extension workers :—

(i) *Wheat.*—N.P. 799 for Northern Bihar ; N.P. 798 for Saurashtra (Halar District)

(ii) *Bajra.*—Hybrid Cuambu in Madras State.

(2) *Problems on which further research is required and should be intensified*—

(i) Breeding for high fertility conditions. This work has been taken up seriously in the case of rice, but not in other crops.

(ii) Exploitation of heterosis in Sorghum, both for grain and fodder.

(3) *New problems on which research should be initiated*—

(i) Research on utilisation of agricultural waste products.

(3) REVIEW NOTE ON ENTOMOLOGY

BY

DR. E. S. NARAYANAN

I. Problems on which research work has been completed and the results obtained therefrom can now be passed on to the extension workers for general adoption.

A. *Control of mustard aphid, Lipaphis crisimi (Davis).*

(a) One lb. of tobacco in one gallon of cold water soaked for 24 hours or one lb. of tobacco boiled in a gallon of water for one hour. Dilute the mother solution with six to eight gallons of water with addition of 1/2 lb. of soap. Spray at the rate of 60 to 100 gallons per acre according to the degree of infestation.

(b) Nicotine sulphate 40% one part in 600-800 parts of water. Add. 1/2 to 3/4 lb. of soap in 60 gallons of the solution and spray at the rate of 60 to 100 gallons per acre according to the degree of infestation.

(c) Pyrethrum extract containing 2 to 3% pyrethrins—one part in 800 parts of water. Spray at the rate of 60 to 100 gallons per acre according to the degree of infestation.

(d) Endrin 4 ozs. per acre of pure Endrin—spray.

(e) Diazinon 4 ozs. per acre of pure Diazinon spray (we have not enough data of Endrin and Diazinon on their use on fruits and vegetables for immediate consumption. Therefore these two insecticides are not recommended for infested fruits and vegetables.

B. *Control of jassids on Bhindi and other crops.*

(a) 0·1% to 0·15% DDT suspension of 3 lbs. of 50% wettable DDT in 100 gallons of water per acre.

(b) Pure Endrin 2 to 4 ozs. per acre (Endrin) is generally available in the form of 10·5% emulsifiable concentrate. Hence use 10 to 20 ozs. of this concentrate in 100 gallons of water. The number of gallons per acre will depend upon the degree of infestation.

C. *Paddy thrips, Thrips orzae W.*

Dust with 5% BHC at the rate of 15-20 lbs. per acre according to the degree of infestation. Spray with 0·1% to 0·2% wettable BHC at the rate of 40 to 60 gallons per acre.

D. *The paddy swarming caterpillar, Spodoptera mauritia Boised.*

Dust with 5% BHC at the rate of 15 to 20 lbs. per acre according to the degree of infestation. Dust in the evening.

II. *Problems on which further research is required and should be intensified.*

The research work in the Scheme on insect physiology should be intensified on the following aspects :

(a) Physiology of various silkworms to be studied with reference to temperature, humidity, age and type of host plant etc.

(b) Detailed biology to be worked out under control and field conditions.

(c) Disease resistance and deficiencies of minerals and vitamins.

III. *New problems on which research work should be initiated.*

Reserach work on the taxonomy, biology and control of aphids, jassids, white flies and mites should be initiated at a very early date. This was the unanimous view of the entomology and animals pests committee.

(4) REVIEW NOTE RELATING TO PLANT DISEASES

BY

DR. R. S. VASUDEVA

I. *Problems on which research has been completed and the results of which can now be passed on to extension workers for general adoption.*

Suitable control measures for "Katte" disease of card have been evolved. The disease has been successfully controlled in Bombay State by the eradication of diseased plants and rehabilitating the gardens by transplanting disease-free seedlings. The present position of the campaign is that gardens, which are away from diseased area and in which all the diseased bushes were destroyed and replaced by healthy plants, continue to be free from disease for the last few years.

Work in Madras has shown that ergot of desired quality can be produced in Nilgiris.

II. *Problems on which further research is required and should be intensified.*

In addition, work on virus diseases of mango and citrus as also on green ear disease of bajra requires to be intensified.

III. *New problems on which research should be initiated.*

(a) The Plant Diseases Committee felt that in view of heavy losses particular attention was necessary to the study of diseases of fruit plants and vegetables. Diseases like root rot of apple as also suspected hairy root and fire blight require immediate attention. Mycro-organism-nematode associations in relation to plant diseases also require to be studied.

(b) The Committee gave priority to the study of fungicides, particularly the systemics. It was considered necessary that work on screening of the existing material as also on the un-explored sources for development of new fungicides from our ever increasing waste products should be taken in hand.

(5) REVIEW NOTE ON HORTICULTURE

BY

DR. K. C. NAIK

I. *Problems on which research has been completed*

1. At the University of Trivandrum two high yielding hybrids of topioca *viz.*, H. 96 and H. 105 have been evolved and two selections of promise *viz.*, M. 4 and M. 6 are also available for distribution.

2. Studies at the Central Banana Research Station, Aduthurai (Madras) with Monthan variety of banana have shown that cutting the pseudostem completely to the bottom after harvest of the bunch is less preferable to leaving the pseudostem untouched or cutting to half its height after the harvest.

3. Pusa Ruby (Hybrid 10), bearing luscious red tomatoes and Early Grano, an introduced onion from U.S.A. have given high yields at the Indian Agricultural Research Institute, New Delhi.

4. By treatment of fruits and vegetables with a six per cent fungicidal wax emulsion it is found possible to increase the storage lives of fruits and vegetables by about 50% at room temperature.

5. Mandarin orange trees in Wynaad (Malabar) which were manured and mulched were able to withstand drought conditions better than other trees receiving such treatments as (i) digging round plants twice a year (ii) mulching alone, (iii) growing a cover crop, (iv) digging twice and manuring, and (v) cutting down weed growth.

II. *Problems on which further research is required to be intensified.*

1. Artificial induction of mutations in horticultural crops and selection from the same.

2. Though work in purifying and improvement of varieties is going on in many centres, in some fruits the mixtures of 'off' types have become mingled so much with the standard type that it is necessary to establish a "norm" for each variety as a first step towards screening of inferior mutations and also to pick out the superior mutants to be multiplied either as clonal strains or distinct varieties.

3. Since it has been found possible to obtain triploid varieties of grapes from chance seedlings and there are also possibilities of obtaining useful variants for such characters as leaf size, drought resistance, disease resistance etc., large scale selections from seedlings would be a fruitful line of pursuit in all fruit crops, particularly in view of the absence of any systematic hybridisation and selection projects in fruits.

III. *New problems on which research has to be undertaken.*

1. Trials on the use of artificial light to control flowering and fruiting in ornamentals and vegetables.

2. Research on the use of plastics in plant propagation, as mulches, tree fumigation tents, irrigation siphons, cubes for embedding insects and other specimens as package film etc.

(6) REVIEW NOTE ON THE PROGRESS OF STATISTICAL RESEARCH IN AGRICULTURE

BY

DR. V. G. PANSE

I. *Problems on which research has been completed and the results of which can now be passed on to extension workers.*

Statistical Research in agriculture is mostly methodological and aims at assisting the agricultral research workers by providing them with techniques for designing experiments and other observational programmes and for interpretation of the resulting data. In the field of agricultural statistics it aims at providing suitable sampling techniques for securing statistics, such as crop areas and yields, cost of production of crops, objectively and with precision.

Sample surveys for estimation of crops yields, according to the technique developed by the Indian Council of Agricultural Research are being adopted on a countrywide scale and have brought about a substantial improvement in the statistics of food crops.

The technique of experimentation on cultivators' fields which was evolved has been widely used and is giving very useful results.

Some work has been done with regard to experimental techniques for coconut and it has been found that (i) a major fraction of total variability is inherent in the coconut trees themselves as distinct from soil variability and that the collection of data for preliminary years before the experiment is started is of greater value in increasing the precision of the experiment than the use of designs adopted for annual crops, and (ii) distinct biennial tendency exists in coconut trees and therefore the data consisting of two years' totals rather than individual years is distinctly better for securing greater precision of results.

II. *Problems on which further research work is required and should be intensified.*

Pilot sample survey for collecting information on fertilizer use and other farming practices or the cultivator is in progress in a few districts, but needs to be intensified since this information will serve as a basis for agricultural developmental projects involving increased use of fertilizers and other improved practices.

Sampling for area, yield and cultivation practices of pepper and other allied crops presents special problems for study work is already in progress on pepper for the third year and needs to be extended to other similar crops.

Uniformity trial data on pepper has been collected for one year and is under study for evolving suitable lay-outs for experiments on this crop. There is need for collecting more uniformity data on this and other similar crops and steps are being taken in this direction.

III. *New problems on which research should be initiated.*

The Statistical Committee recommended at its last meeting held during October, 1956. that suitable techniques should be evolved for estimating the production of cashewnut and cardamom which are crops of considerable commercial importance, and of other important minor crops like fruits, vegetables, etc., all these crops presenting peculiar sampling problems.

There is need for critical analysis of the results of past long term experiments dealing with organic and inorganic manuring and planning new experiments of this type. (310)

(7) REVIEW NOTE ON COCONUTS

BY

DR. P. J. GREGORY

Introduction

The area under coconuts in India is about 1·6 million acres producing about 3400 million nuts annually. As a result of the growing demand arising out of increasing population and expansion of industries using coconut oil, India's production does not meet her full requirements. The present deficit is estimated to be of the order of about a third of our production. Import of appreciable quantities of copra and oil has therefore been found necessary. In the past, research work on coconuts was done by different States according to their requirements and financial resources. In 1945 the Indian Central Coconut Committee was constituted and it was entrusted by Government with the work of resuscitating the coconut industry in India in all its aspects. One of the first things this Committee did was to organise agricultural research on coconuts on all India basis. The need for setting up Central Research Stations to tackle problems of a fundamental nature and Regional Research Stations for tackling problems of local importance was well realised by the Committee and two Central Coconut Research Stations, one at Kasaragod in North Kerala for work connected with botanical breeding and agronomic aspects of coconut and another at Kayangulam in the South for carrying out investigations on the pests and diseases of coconuts, were set up. Five Regional Research Stations in the different coconut growing States were also established.

Research.—In India research work has been done on the following aspects:—

1. *Crop Improvement*

(i) *Selection and propagation of high yielding palms.*—The criteria for the selection of seedlings of good quality planting material was evolved. Based on these, Government nurseries are now being run in the different coconut producing States in India to supply quality seedlings on a large scale to coconut growers at a subsidised rate.

(ii) *Introduction of varieties.*—Generally the introduced varieties have not lived up to their reputation in their original habitat. Most of them were found to be more susceptible to pests and diseases and also gave lower percentage of oil than the ordinary tall variety of the West Coast of India. However, some like the Andaman Ordinary, Laccadive Ordinary, Laccadive Small, Cochin China, etc. appear to be promising. A comprehensive collection of all the important exotic varieties have now been taken up at the Central Coconut Research Station, Kasaragod.

(iii) *Hybridisation*:—Inter and intra varietal hybridisation work is in progress. A study of the progenies planted out at the Agricultural Research Station, Nileshwar showed that hybrids of crosses between parents with high female flower production, high setting and high yield and thick meat are promising. The *Tall Dwarf hybrids have been outstanding in their performance. The progenies are vigorous and good bearers, combining the early bearing nature of the dwarf with the good nut and the copra characters of the tall variety. These hybrids are now being produced in limited number for supply to growers.

2. *Agronomy and Soil Chemistry*

(i) *Interculture* :—Experiments conducted at Kasaragod have shown the necessity for proper intercultivation in coconut gardens. Though manuring should be done along with intercultivation the latter by itself is able to improve yields considerably. It was found that intercultivation without manuring was better than manuring without intercultivation.

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* The dwarf with the good nut and copra characters of the tall.

(ii) *Manuring*:—Manurial experiments conducted in the past using common organic and inorganic manures have shown that in the West Coast of India under rainfed conditions 4½ lbs. of ammonium sulphate and 20 lbs. of ash was a very suitable manure for adult coconut palms. It was also shown that ammonium sulphate could be substituted by groundnut cake and ash by potassium sulphate on equivalent nutrient basis. A factorial manurial experiment with N P. and K at three levels with and without basal application of green manure has been started at Kasaragod and is in progress.

(iii) *Use of press mud and backwater silt* :—Press mud from sugar factories and silt from river mouths and backwaters have polymanurial value and can be used to improve coconut plantations.

(iv) *Husk burial* :—Burying unwanted husks in coconut gardens in trenches dug in between rows of coconut trees in the red loamy and lateritie soils was found increase the yield of coconuts appreciably. The beneficial effect of one course of husk burial at the rate of 1000 husks per tree lasts for more than 5 years.

(v) *Depth of planting* :—Experiments conducted regarding this have shown that in areas where the soil is deep and the water table now, three feet deep planting is preferable. Surface planting was found to restrict root forming in the soil and also to favour the concretion of the roots on the surface layers where they are subject to the effect of drought in summer months.

(vi) *Green Manuring* :—As a result of a series of trials conducted it was seen that *Crotalaria striata* was most suited for growing as green manure in coconut plantations. *Peuraria phaseoloides* and *cateapogonium mucuoides* are promising as green manure cum cover crop. *Glyricidia maculata* has been found to be a good green manure bush for growing on the borders of fields.

(vii) *Subsidiary crops*:—Dry paddy, Varagu (*Papsalu-scrobiculata*) tapioca and pineapple were found to come up well in coconut gardens. The subsidiary crops have to be adequately and separately manured.

3. *Maturity of nuts in relation to copra and coir*

Investigations conducted in this connection have shown that harvesting of nuts which are less than eleven months old resulted in loss both in copra and oil. Eleven months old nuts on the other hand gave good quality fibre from the husks and also good copra.

4. *Control of button shedding*

Shedding of female flowers or button and immature nuts is a common phenomenon in coconuts. Trials to promote better setting by spraying with hormones like 2, 4 D has given encouraging results.

5. *Fixing grade standards for copra and coconut oil.*

A large number of samples of copra and coconut oil collected from different markets and producing centres were analysed for the different quantitative and qualitative characters. Based on the data obtained definite standards have now been prescribed by the Agricultural Marketing Department and the Indian Standards Institution.

6. *Pests of coconuts*

The three major pests of coconuts are the rhinoceros beetle (*Oryctes rhinoceros*) the coconut caterpillar (*Nephantis serinopa*) and the palm weevil (*Rhynchophorus ferruginues*).

(i) *Rhinoceros beetle* (*Oryctes rhinoceros*ı :—The life history of this pest has been exhaustively studied and the following control measures have been found useful:—

(i) *Rhinoceros beetle* (*Oryctes rhinoceros*) :—The life history of breeding material ;

(2) Searching for and mechanical extraction of the beetle with iron hook ; and

(3) Insecticidal—the application of 0·01 per cent BHC in breeding material is found to be lethal to the larvae. Investigations on its biological control were also in progress. The larvae of an Elatrid beetle and a scarabaeid were observed to be feeding on the eggs of *Oryctes*. The green muscardine fungus is also being tried.

(ii) *The coconut caterpillar, Nephantis serinopa*:—The life history of the pest has been studied. Under conditions of the West Coast of India, it is capable of completing five to six generations annually. Control measures evolved consist of the following mechanical, insecticidal and bilogical. Mechanical control consists in the cuting and burning of infested leaves. This is applicable only in the case of minor and isolated infestations. In insecticidal control it was found that spraying of the infected fronds with 0·2 per cent DDT could keep the pest under control. With regard to biological control it is seen that the pest is attacked by a number of parasites and predators. Some of these parasites are amenable to rapid mass breeding in laboratories. They are, therefore, bred in large numbers in zonal Parasite Breeding Stations, located in different places and liberated in infested localities for parasitising the pest and bringing down its population level.

(iii) *The pam weevil* (*Rhynochophorus ferrugineus*):—Studies on its life history were conducted. The pest is able to complete more than three generations in South India. With regard to its control it has been found that a combination of pyrethrines piperonye butoxide as I per cent solutions injected into the affected portions of the coconut palm gave satisfactory control of the pest.

Minor Pests.

Cockchafer, Leucopholis coneophora :—The larvae of this feed on tender coconut roots, weaken the tree and cause reduction in yield. Insecticidal trials on its control have shown that the application of 5 per cent Chlordane dust at the rate of 28 lbs. per acre could control it.

Other minor pests studied are *Contheyla rotunda, Natada nararia, Suastus gremius, Parasa lepida, Gangara thyrsis, Coccids, termites* etc.

7. *Diseases of the coconut palm.*

(i) *Bud rot*:—This is caused by the fungus *Phytophthora palmivora.* This is generally noticed in coconut gardens where palmyra palms also grow along with coconuts. If the disease is noticed in its early stages the trees can be saved by removing the infected portion and smearing the wound with Bordeaux paste. Generally the disease is detected only in advanced stages of infection. As a prophylactic measure it would be advisable to spray coconut palms with Bordeaux mixture before and after the South West Monsoon.

(ii) *Stem bleeding*:—Local infection by *Ceretostomella paradoxa* is considered to be the cause. Unfavourable soil conditions like high acidity or alkalinity, improper aeration of roots, lack of balance in water supply, etc., also play an important part in symptom production. The disease can be checked by cutting out the infected tissue and applying tar to the wound and by restoring optimum soil conditions.

(iii) *Anabe roga* or *Trunk rot*:—This disease is incited by *Ganoderama lucidum.* As control measure the badly infected trees should be felled and the but of the stem and roots which harbour the fungus should be dug out and burnt. The soil around the neighbouring palms should be treated with 2-3 lbs. of fine powdered sulphur.

(iv) *Leaf rot disease*:—This is caused by *Helminthosporium halodes.* The symptomatology of this disease has been worked out in detail. It was found to be amenable to spraying with copper fungicides. This spraying is to be done to the inner leaves three times per year.

(v) *Root (Wilt) disease*:—This disease and the *leaf rot* disease generally appear together in Central Travancore. Its symptomatology has also been worked out in detail. Investigations on its etiology have now given indication that it might be of virus origin.

8. *Soil studies in relation to disease*

Comparative data on the nutritional status of coconut soils in Travancore-Cochin have shown that certain factors are generally associated with disease incidence *viz.* (i) Low calcium and low available and exchangeable potassium, (2) low pH, (3) Low values for exchangeable bases, (4) High water table or the presence of some impermeable layer near the surface which could bring about water logging.

Analysis of plant tissues has indicated that leaf samples from diseased palms have higher status of nitrogen, magnesium and phosphoric acid.

A micronutrient manurial experiment to study the role of micronutrients in disease causation has been started. Investigations on the physiology of the coconut palm are in progress.

Problems that require further research

1. *The use of radio active isotopes in studies on the nutritional aspects of the coconut palm.*

This technique could be used to investigate the nutritional requirements of the coconut palm. The quality and quantity of the fertiliser ingredient taken up by the plant soil in the different stages of its growth and the evaluation of these materials required for any special purpose *in vivo* could be carried out quickly and correctly in connection with physiological studies.

This can be used in studying the host parasite relationship in coconut diseases.

2. *Micronutrient requirements of the coconut palm*

Our information regarding this is very meagre and a good deal of work both in the laboratory and in the field has yet to be done on these aspects.

3. *Use of hormones in plant improvement*

Further work in this connection appear to be necessary.

4. *Soil Conditions*

The use of soil conditions like Krilium especially in sandy soils has to be tried to improve the soil physical conditions.

5. *Systematic insecticides and fungicides*

This is another item about which very little information is available in relation to coconuts.

6. *Fertiliser placement*

There is a lot of scope in this country for this kind of research.

7. *Mechanisation*

The possibility of mechanisation of coconut estates to ensure greater efficiency and production has to be looked into.

(8) REVIEW NOTE ON INDIAN TOBACCO

BY

DR. M. S. PATEL

Tobacco was introduced in India in 1605 A.D., by the Portuguese. At present, Indian is one of the principal tobacco producing countries of the world being third after the U.S.A. and China.

The role of tobacco in Indian economy is of multifold importance. Agriculturally, it brings to the Indian grower an annual return of about Rs. 32 crores ; commercially it fetches for the country foreign currency to the tune of about Rs. 13 crores ; and by way of excise duty, it enriches the National Exchequre by about Rs. 32 crores annually. In addition, an annual income of about Rs. 6 lakhs is derived from it by way of Agricultural cess.

In India, mainly two distinct Botanical species are grown Nicotiana tabacum and Nicotiana rustica. The plant of the former is pink-flowered with large sessile leaves while that of the latter is smaller and hardier with yellowish flowers and smaller leaves. Tabacum provides the whole of the export trade of India with only a very small portion consisting of rustica. Nicotiana tabacum is used for the manufacture of cigarettes, cigars, cheroots, pine tobacco, bidi, and may be used for chewing and snuff while Nicotiana rustica is mainly used for hookah, chewing and snuff purposes. Rustica represents about 8 per cent of the total production of tobacco in India and is generally confined to the tobacco growing areas of Upper India. In that region, tabacum types are also grown but approximately 80 to 90 per cent thereof is grown in Peninsular India. More than 95 per cent of cigarette tobacco is produced in Andhra State and the rest in Mysore, Bihar, Punjab and Bombay States. Bidi tobacco is mainly confined to Charotar and Nipani areas of Bombay. Small quantities are also grown in Madras and Mysore States. Cigar and Cheroot types are cultivated mostly in Madras, West Bengal and to a leseer extent in Orissa. Hookah tobacco is grown mainly in U.P., Bihar and Punjab. Small quantities are grown in Bombay also. Snuff and chewing tobaccos are mostly produced in Madras, Bombay, Orissa, Bihar and Uttar Pradesh. The Indian tobacco acreage and production during 1955-56 was 921,000 acres and 580 million lbs. respectively.

Virginia tobacco which is mostly grown in Andhra Pradesh is used for making cigarettes and is commercially most important. White Burley tobacco, also grown in Andhra State, is mostly used for blending in cigarettes and for pipe and shag mixtures. The 'Natu' type is mainly used in the preparation of small handrolled cheroot locally known as chutta. Light brown leaves of this tobacco are used in the manufacture of cheap cigarettes. Dark brown leaves are exported to the U.K. for manufacture of different brands of pipe tobaccos. The main manufactured products of the tobacco in India are cigarettes, cigars, bidis, cheroots, snuff, chewing and hookah tobaccos.

The important varieties of tobacco exported are flue-cured Virginia, sun-cured virginia, white burley sun-cured country and bidi. Chief market for Virginia tobacco is the U.K. where it is used in the manufacture of cigarette as the characteristics of Indian flue-cured virgina tobacco enable it to be readily blended with other tobaccos. The chief qualities are that it is neutral in taste, is of bright lemon or golden colour and is very cheap in price. The other types of Indian tobacco purchased by the U. K. are White Burley and S.C.V. for pipe and shag mixture. On the continent there is demand for various grades of f.c.v. tobaccos. Majority of the tobacco exported to Ceylon Aden and Dependencies, Egypt and other countries consists of Natu and bidi tobaccos.

Alive to the importance of tobacco in the country's economy the Government of India constituted in November, 1945 the Indian Central Tobacco Committee for promoting all aspects of tobacco cultivation, development and its marketing.

The Committee has since established a Central Institute at Rajahmundry (Andhra Pradesh) for fundamental research on all types of tobacco and applied research on cigarette and lanka tobacco grown in that area and regional experimental stations at Vedasandur (Madras) for cigar and cheroot tobacco, at Pusa (Bihar), for hookah and chewing tobacco, and at Dinhata (West Bengal) for hookah and wrapper tobacco. A Sub-Station for flue-cured virginia cigarette tobacco which also serves as a regional station for natu tobacco, is functioning at Guntur (Andhra). In addition to the above, the Committee also finances wholly or partly the bidi tobacco work at Anand and Nipani in Bombay and hookah tobacco research sub-station at Ferozepur (Punjab). Besides, the Committee finances about 10 research schemes at different regions.

Training facilities for workers in field of tobacco are also provided by the research institute and candidates from abroad were given training in various aspects of tobacco cultivation at the Committee's Research Institute.

Research on all these stations mainly aims to improve the quality and yield per acre and to minimise the cost of production.

I. *Problems on which Research has been completed and the Results can be passed on to the Extension Workers for General Adoption*

Cigarette Tobacco

1. (a) The manurial requirement in nursery beds has been worked out.
   (b) A spraying schedule for controlling 'damping off' which is a serious disease in nurseries, has been evolved.
2. A method of cleaning and pre-treating seed and storing in optimum conditions to retain its germinating capacity, has been adopted.

   Germination has been found to improve by low temperature treatment of seed at 64° to 72° F.
3. In cigar tobacco the uptake of various major nutrients by the crop have been estimated and the nutritional requirements of the crop at various stages have been determined.
4. A method of cheap manufacture of nicotine sulphate from waste tobacco has been evolved by the National Chemical Laboratory, Poona.
5. Application of coconut oil to axillary buds has been found to suppress the growth of suckers.
6. Orobanche can be eradicated by continuous removal before seeding.
7. An improved schedule of curing, reducing coal consumption and increasing the percentage of bright grades has been evolved.
8. Small curing barns capable of dealing efficiently with small quantities of tobacco have been devised.

9. The optimum seed rate has been found to about 3 lbs. per acre of nursery.

10. Dosages of D.D.T. and Rhothane suitable to control effectively cut-worms and cater-pillars in the nurseries have been found.

11. It is found that about 2 plughings and 2 to 3 harrowings are sufficient in a normal season. More tillage is desirable only if more than normal rainfall is received.

12. The spacing 48″ × 24″ which is more convenient for interculturing and better judging of leaf at harvest has been found to be as good in yield as the farmers' practice of spacing 33″ × 33″.

13. The optimum requirement of N for flue-cured tobacco has been determined.

14. Ammonium sulphate, ammonium sulphate nitrate, chilean nitrate and urea, have been found to be equally efficatious as sources of nitrogen.

15. No differences were found between the efficacy of organic nitrogenous fertilisers, *viz.*, blood meal, fish meal, horn hoof mean and stera meal.

16. Lack of response of Virginia tobacco crop to P_2O_5 and K_2O in heavy black soils under the present cultural practices, has been established.

17. Application of sulphur to the soil in between rows of tobacco has been found to control powdery mildew.

18. Dosages of D.D.T. & Rhothane suitable to control effectively cut-worms and caterpillars in the field, have been found.

19. A dosage of Dieldrin 5% W. P. and the method of its application to control ground bestles in the field, have been found.

Natu Tobacco (*Andhra State*) :

20. It is found profitable to top Natu tobacco at 18 to 20 leaves at flower-head instead of at 14 to 16 leaves as done by growers.

21. Application of 30 lbs. N has been found to be profitable.

Bidi Tobacco (*Gujerat & Nipani*) :

(GUJERAT)

22. Application of 80 lbs. N as oil cake and top dressing at 80 lbs. N as ammonium sulphate has been found to be the best manurial treatment in the nursery.

23. The optimum seed rate has found to 4½ lbs. per acre of nursery.

24. A higher yielding strain K_2O has been evolved.

25. 3′ × 3′ spacing has been found to desirable.

26. Topping at 11 leaves has been found to give the maximum outturn.

27. The economic dose of Nitrogen manuring has been found to lie between 80 to 160 lbs. per acre as oil cake.

28. Lack of response of bidi tobacco crop to P_2O_5 under the present cultural practices has been established.

(NIPANI)

29. An early maturing and high yielding strain, S 20, has been released for cultivation.

30. Growing tobacco without rotation has been found to be beneficial from the point of quality.

Cigar Tobacco (*Madras State*) :

31. October planting is better than November planting.

32. Topping at 14 leaves is found to be advantageous.

33. The economic dose of manuring has been found to be application of 20 cart-loads of f.y.m. and 100 lbs. N.

34. Spilt application of N has been found to be more beneficial than application in one dose.

35. When tobacco is manured at the above rate it becomes unnecessary to manure the cumbu (Pennisetum typhoides) coming in rotation.

36. Ammonium sulphate, ammonium sulphate nitrate, Chilean nitrate and urea, have been found to be equally efficatious as sources of nitrogen.

37. No differences were found between the efficacy or organic nitrogenous fertilisers, *viz.*, blood meal, fish meal, horn hoof meal, and stera meal.

38. Lack of response of cigar tobacco crop to P_2O_5 under the present cultural practices, has been established.

Chewing Tobacco (*Madras and Bihar States*) :

(MADRAS)

39. October planting is better than November planting.

40. Topping at 10 leaves has been found to be advantageous.

41. The economic dose of manuring has been found to be application of 20 cartloads of f.y.m. and 100 lbs. N.

42. Split application of N has been found to be more beneficial than application in one dose.

43. Lack of response of chewing tobacco crop to P_2O_5 under the present cultural practices, has been established.

(BIHAR)

44. High yield strain *viz.*, T. 218 & T. 238 of rustica tobacco have been very promising.

45. Application of 50 to 100 lbs. N per acre has been found to be beneficial.

Hookah Tobacco (Punjab State).

46. High yielding strains, *viz.*, T. 218 and T. 238, of rustica tobacco have been evolved.

47. The optimum period of transplanting has been found to be middle of February and not later as done by growers.

48. The optimum dose of N for hookah tobacco (both tabacum) and rustica) has been found to be 100 lbs. N per acre, half as ammonium sulphate and half as groundnut cake.

49. Application in a split dose, one at planting time and the second time at flowering, has been found to be better than application in one dose.

II. *Problems on which further research is required and should be intensified.*

1. *A drastic change in cultural methods*

Nature and extent of the problem, in brief.—Several experiments have beeen conducted at both the Central Tobacco Research Institute, Rajahmundry and its Sub-Station at Guntur in respect of fertilisation of the crop with N, P and K, and the time and method of fertiliser application, for several seasons. While there has been limited response only to about 20 lbs. N in certain types of fields (which are probably deficient in capacity for nitrogen recouperation), no response to P or K in respect of yield and quality as judged normally by trade characters has been observed in any of the experiments. Even the growth difference observed, only during this season in favour of P_2O_5 (in combination with N) treated crop in the initial stages was evened out later on and this crop did not show any advantage over the crop treated with N in yield, colour, body or burning quality of the leaf. In the case of the Rhodesian crop it was seen that there was good response of the crop in yield and also quality to application of even high doses of P_2O_5. In fact, increases in yields of quality leaf above a certain limit are said to be realised more through P rather than N (N is permitted to be applied by the grower in small quantities, *i.e.*, from 4 to 40 lbs. per acre on the basis of his experience). The burning quality is said to improve with the application of potash, topping was seen to be very effective in improving yield and body of the leaf. A clear difference was noticeable in respect of the root system which in the Rhodesian crop consisted of a very large number of fibrous roots, while the Indian crop usually has mainly 2/3 tap roots and just a few fibrous roots. This difference was reflected in far better size and body of the Rhodesian tobacco. The average length of the Rhodesian leaf (cured) was said to be 18″ to 20″ while that of the Indian leaf is approximately 12″ to 18″. The number of leaves per lb. of the Rhodesian crop are said to be about 50 to 60, while those of Indian crop, as estimated at the Institute, are about 115. It is therefore felt that a good development of the root system is the first essential for a good crop. Since it was also observed that any amount of manipulation in curing did not substantially improve the quality of a badly raised crop, it would mean that for producing good quality leaf one has to look primarily for a well grown crop which in turn would depend upon the development of a good root system.

For securing a good root system, the sandy soils in Rhodesia are naturally helpful. In addition, the soil is ploughed deep (subsoiling is also done in certain cases), plenty of humus is incorporated through suitable grass rotations, and planting is done on broad high ridges.

In the Andhra State, the soils are clayey and heavy and, as such, are not conducive to good root development. It is, therefore, thought essential to conduct experiments involving the loosening of the soil by tractor ploughing and incorporation of cheap humus of the sort of paddy husk, chopped tobacco stalks and by grass green manuring.

The Rhodesian crop is raised during the rainy season as a result of which satisfactory amount of moisture is available in the soil for utilisation of fertilisers by the crop. This is probably one of the reasons why there is good response to the high doses of P_2O_5 (upto 400 lbs. per acre in some cases.)

In the Andhra State the crop grown on conserved moisture almost at the termination of the monsoon, since it is not possible to grow the crop during the monsoon in such soils It is, therefore, very essential that, firstly, as much moisture as possible is conserved and, secondly, as least of it as possible is allowed to be lost through evaporation, etc.

While it is thought that for both better moisture conservation and retention, incorporation of the humus as suggested above would be helpful, the need is though also of providing a mulch after about the first interculaturing.

2. *Use of fertilisers including more* P_2O_5 *and* K_2O

3. *Topping.*

4. *Rotation.*

5. *Elimination of cultivation in saline areas of Andhra State and extension of same in lighter soils.*

NEW RESEARCH PROBLEMS TO BE TACKLED.

1. A study of nursery practices and methods, designed to determine,
   (a) the practicability, methods of management, and economics of covered nurseries,
   (b) the possibility of controlling nursery diseases by soil sterilization, heat and chemical means.

2. Investigation into the possibilities of controlling by disinfection or other means the heavy loss caused by various rots in seedlings during transportation from nursery to field.

3. A study of deficiency diseases of seedlings in the sandy soils of the Guntur belt.

4. A study of the phenomenon of 'Hybrid vigour', with a view to utilizing it in tobacco growing.

5. A physiological study of the uptake of the elementary plant foods and their effect on the different stages of growth and development of the tobacco plant.

6. A study of methods to improve the colour retention in cigarette tobacco leaf produced in submerged areas.

7. Investigation of the methods of green leaf bulking of rank coarse tobacco in effecting colour change.

8. To determine the factors responsible for the loss of colour in tobaccos produced on brackish soils.

9. Quality in cigarette tobacco is judged by such properties as colour, texture, flavour, body, burning, ash, elasticity, boniness, aroma, gum and oil. An intensive investigation into the factors which influence and produce these properties, with a view to producing and controlling favourable factors in general tobacco production. This investigation will include :—

    (a) the part played by variety,

    (b) the part played by climate,

    (c) the part played by N.P.K. alone and in combination and in the form of different salts,

    (d) a study of the chemical, physical and biological characteristics of soils on the qualities of tobacco they produce and, in particular, of those soils which produce very good and every bad quality tobacco,

    (e) chemical study of tobacco samples taken from different factors with a view to co-relate the constituents of tobacco with those factors,

    (f) the influence of the nature of the sub-soil on quality,

    (g) determination of the constituents present in tobacco considered by the trade to be of high quality (including imported Virginia cigarette tobacco) with a view to produce tobacco embodying those constituents,

    (h) study of amino-compounds in tobacco leaf and the enzyme action going on in the leaf, since on them colour, flavour and texture are said to depend,

    (i) the part played by trace elements in the soil in determining quality,

    (j) investigation of the possibility of appraisingly quality on some basis comparable with that used for tea.

10. An investigation into the rib crushing process for cigarette tobacco with reference to its practicability, effect on manufacturing quality and economics.

11. To ascertain why in many seasons fertilizers give a negligible response with tobacco on black cotton soils.

12. A study of the fundamental aspects of insect pests and disease control, including insect vectors, which carry diseases such as leaf curl and the parasitism of pests, such as Orobanche, in order to provide basic information essential for their control.

13. To devise cleaning and sterilization methods or treating seed with special reference to seed and chaffborne diseases, such as Cercospora Spot disease and Mosaic.

14. A study of tobacco weevils and methods of control.

15. A study of the methods of controlling wood borers which attack Indian timber, used for packing tobacco for export.

16. A study of Pati lands, which are free of Orobanche, to ascertain whether they possess any peculiarities to which the absence of that parasite can be attributed.

17. A study of the relationship of the soil to deficiency diseases of tobacco.

18. A complete study of the fule-curing process and of the physical, chemical and biological changes that occur in cigarette leaf at all stages of curing in order to improve the present purely empirical methods of curing and to determine the cause for various phenomena which occur during the curing process.

19. A study of the changes that occur in tobacco leaf with fire-curing, air-curing, stalk-curing, ground-curing and pit-curing, in order to effect improvements in these practices.

20. A full chemical and biological study of the changes that occur in tobacco leaf during ripening bulking, fermentation, redrying, processing and ageing or maturing.

21. A study of the possibilities of improving cigarette tobacco green leaf of inferior quality in the flue-barn by treatment with various gases.

22. A study of teh possibilities of using electricity and oil fuel for heating flue-curing barns.

23. A study of the possibilities of evolving a machine with mechanical control for maintaining uniform temperatures in a curing barn.

24. To determine the best climatic conditions for storing tobacco of all types and particularly with reference to colour retention in cigarette tobacco.

25. A study of factors, such as humidity and temperature, with control oxidation and reddening of tobacco leaf in storage and the determination of optimum atmospheric storage conditions.

26. An investigation into the fire-curing of tobacco for pipe purposes.

27. A study of methods of improvement in the curring process of cigar and cheroot tobaccos.

28. An examination of factors determining quality in wrapper and binder tobaccos.

29. A study of the quality characteristics of 'filer' tobaccos for cigar and cheroot purposes.

30. The improvement of nursery practices.

31. Collection, classification, study and trial of indigenous varieties of tobacco.

32. Introduction and trial of outside varieties.

33. Selection and breeding of improved varieties, with special reference to high yield, good quality, increased proportion of high grade leaf, resistance to pests and diseases, suitable nicotine content, earliness to suit special conditions such as drought, flood, etc.

34. A study of cultivation practices at all stages from nursery to harvest and including nursery raising, preliminary cultivation, spacing, inter-cultivation, irrigation, harvesting, curing, etc., in order to evolve a suitable cultivation schedule for each type.

35. A study of manurial requirements of each type of tobacco under different conditions and the subsequent evolution of suitable manurial schedules for each type under different soil, climatic and cultivation conditions.

36. A study of crop rotations and their influence on the yield and quality of different types of tobaccos.

37. A study of the physics and chemistry of the soil in relation to food requirements of different types of tobacco, and of the chemistry and bio-chemistry of the tobacco plant grown on it.

38. Studies of nicotine content for special purposes.

39. A study of the principal pests, diseases, and parasites of the tobacco crop and the determination of suitable methods of controlling them.

40. The annual production of nuclei of pure selfed seed of the different types and varieties of tobacco for subsequent multiplication, in order to provide for tobacco growers a supply of pure and certified seed.

(9) REVIEW NOTE ON ANIMAL DISEASES AND PESTS

BY

SHRI L. SAHAI

I. *Items on which work has been completed and the results can be applied in the field.*

(a) Control of the large intestinal round-worm *Ascaridia galli* of poultry—*A. galli* is a common parasite of poultry in India. It is responsible for poor condition, retarded growth, low productivity and often high mortality, specially among young birds. As a result of investigations carried out it has been established that the susceptibility of birds to infection with the roundworm increases markedly if they are kept on diets deficient in vitamin A and protein. It has also been observed that chickens develop complete resistance to infection with the parasite at the age of 16 weeks, provided they are maintained on adequate diet. In well-fed birds mild infection with infective eggs of the parasite has been found to produce marked resistance to subsequent heavy infections. It is, therefore, necessary to rear chickens up to 16 weeks of age under conditions in which they will not pick up heavy infection. Subsequently no special care is necessary to prevent infection with the large intestinal roundworm, provided the birds are fed properly.

(b) Control of ox-wable-fly (*Hypoderma lineatum*)—For the control of this important pest of cattle, which produces heavy economic losses by causing damage to the hides of affected animals, the following measures are suggested :—

(i) Singeing of hair on the legs of cattle during summer months (middle of March to middle of June) for the destruction of warble-fly eggs, and to find out its suitability for general adoption. In this connection it may be stated that there is a great demand for such a vaccine and that the preliminary laboratory tests carried out both on baby chicks and older birds up to 6 weeks indicated that the vaccine is quite safe and efficacious.

(ii) Dressing the back of affected cattle with suitable insecticides, several of which have been tested during winter months (October to January) for the destruction of full grown larvae found under the subscutaneous tissues of the back.

II. *Items on which work may be intensified*

1. *Rinderpest.*—In order that results may be available with the least possible delay for application in the control of the disease under the mass vaccination compaign being undertaken under the Second Five Year Plan, work on the following items must be intensified : —

(a) Adaptation of goat-adapted virus to the developing chick embryo in order to explore the possibility of cheaper production of the vaccine.

(b) Adaptation of virulent rinderpest virus to the developing chick embryo to explore the possibility of avianising the virus, to obtain an adequately attenuated strain.

(c) Adaptation of lapinised virus into goats to see the possibility of having a cheaper source of lapinised virus.

(d) To undertake extensive field trials with nakamura's lapinised avianised strain of rinderpest virus to see its suitability for the vaccination of highly susceptible types of animals.

(e) To study suitability of goat-adapted rinderpest virus to cattle and buffaloes in the various hilly tracts of India in order to see if this strain would be suitable for carrying out mass vaccination of these animals.

(f) Investigations on duration of immunity conferred by freeze-dried goat tissue vaccine.

(g) Investigations on keeping quality of freeze dried goat tissue vaccine.

2. *Fowl pox.*—To carry out extensive field trials with the egg-adapted strain of fowl pox virus with a view and for their storage and distribution so that their supply to the field can become possible. Closely linked with these is the problem of studying the keeping quality of the two vaccines.

3. *Aetiology of pneumonia in sheep and goats.*—Pneumonia is highly prevalent in sheep and goats in India and its aetiology is very complex. The possibility of a virus being the cause in a proportion of such cases should be investigated systematically.

4. *Foot-and-mouth disease.*—There is urgent need for intensifying research on this disease condition which is most widely prevalent in India and is proving a great menace to the development of the animal industry of the country.

The points requiring immediate attention are in regard to the development of suitable vaccines easy of administration and cheap in cost which will produce a long and lasting immunity. The problem in India being very different from that in the Western countries, requires new line of approach to the problem. The first step is to train a suitable hand in the methods of the study of the virus of the disease and the second to establish a suitable laboratory for the purpose.

5. *Contagious caprine pleuro-pneumonia.*—It has been established as a result of work carried out at the Indian Veterinary Research Institute that an attenuated culture vaccine evolved at the Institute is suitable for prophylactic vaccination and that such vaccine confers immunity for at least 1½ years. That this vaccine is not suitable for use in the outbreaks has also been shown. It thus appears that the live attenuated vaccine is good as a prophylactic in healthy goats in endemic areas and that the formolised vaccine is useful in the control of the disease in the face of outbreaks. Further work is necessary to find out the best methods of large scale production of the two vaccines.

6. *Salmonellosis.*—Recent work has indicated the prevalence among cattle of a large variety of Salmonellas including a new species. The problem is not only important from the point of view

of animal health as these oragnisms may be responsible for a large proportion of deaths among calves in the country but also from the point of view of public health as all Salmonellas are potential pathogens, and, therefore, a danger to human health. Poultry also being highly susceptible to infection with Salmonellas which frequently spread through the agency of fowls and rodents, the problem requires to be investigated from many angles.

7. *Contagious bovine pleuropneumonia.*—At present this infection seems to be limited to the Brahamaputra valley and Assam. To prevent extension of the disease, work is urgently required to develop suitable methods of diagnosis and vaccination against the disease.

8. *Accariasis in calves,* its treatment and control.

9. *Blood-flukes affecting animals,* their pathogenicity and treatment.

10. *Hump-sore of cattle.*

11. *Bearing of nutrition of sheep on its helminthic infections*

12. *Studies on fowl-tick.*

13. *Studies on goat-warble-fly.*

14. *Coccidiosis of poultry.*

15. *Pilot extension work on the control of important helminths of farm stock.*

III. *New items of work*

1. Investigation of the role of predisposing factors such as exposure to chill, fatigue, sudden change of diet, etc., in the causation of haemorrhagic septicaemia.

2. Study of tissue change including inclusion bodies in virus conditions like rinderpest, foot-and-mouth disease, Ranikhet disease, etc.

3. Survey of the economic losses amoungst livestock caused by different diseases in India.

4. Study of the immunological relationships of different types of pox viruses and to develop suitable methods of vaccination against sheep and goat pox.

5. Cerebrospinal nematodiasis in ruminants.

6. Biology of hill leeches.

7. Studies on *Parafilaria bovicola.*

8. Studies on the biology of *Eurytrema pancreaticum* of cattle and *Fusciolopsis buski, Gastrodiscoides hominis and Stephaneurus dentatus of pigs.*

9. Biology of hide beetle, *Dermestes vulpinus.*

10. Development of insecticide resistance in arthropods of veterinary importance.

11. Toxic hazards in treating animals with modern insecticides.

(10) REVIEW NOTE ON HIDES AND SKINS

BY

SHRI L. SAHAI.

I. *Problems on which further research is required and should be intensified.*

(a) The present research work on the manufacture of "fat-liquors" from indigenous raw materials for leather production from Indian hides and skins may be continued in respect of some more Indian vegetable oils, *viz.*, linseed, mustard, yellow oleander seed, etc.

The economics of production may be kept in view while taking up the manufacture of more fat-liquors.

(b) In connection with the further research work on the manufacture of Chrome retan leather from cow hides for military purposes, the physical characteristics, such as tensile strength, durability, etc., of the retan leather may be investigated.

II. *New problems on which research should be initiated*

(a) Under the future programme of research work on the manufacture of leather boards from leather shavings which are waste products of tanneries, stress may be laid on the necessity of finding a suitable substitute for natural latex, the supplies of which are running short in India.

(b) With a view to obtain practicable results under the research for improvement of quality of shoe upper and industrial leather manufactured by mineral tanning, concentrated work may be carried out by taking up only a few salts, mainly the chromium salts, for the present.

(c) With the ultimate object of improving the quality of raw hides and skins from the point of view of damage caused to those by biological factors in India, Mr. B. N. Soni may be asked to write a monograph on the research work carried out by him under the Council's scheme.

(11) REVIEW NOTE ON DAIRY SCIENCE

BY

DR. K. K. IYA.

I. *Problems on which research work has been completed and the results of which can now be passed on to Extension Workers for general adoption.*

(a) Long distance transport of milk.

(b) Nutritive value of milk & milk products.

(c) Methods of rapid determination of keeping quality of milk.

(d) Improved methods of manufacture of Khoa and Channa.

II. *Problems on which research work is already in progress and requires intensification.*

(a) Bacteriological quality of milk in large town where City milk supply Schemes are being organised under 2nd Five Year Plan.

(b) Studies on production of sterilised milk and its economics in market milk organisation.

(c) Detection of adulteration of milk for detection of added water, reconstituted milk powder, added extraneous material etc.

(d) Detection of adulteration of butter fat with vegetable fats.

(e) Development of detergents for village use.

III. *New Problems on which research should be initiated.*

(a) Economies of specialised Dairy farming.

(b) Manufacture of butter of long keeping quality from market cream.

(c) Studies on the let down on milk with special reference to machine milking.

(d) Studies on chilling plants (including absorption system of refregeration) for use in transport of milk over long distance.

(e) Studies on the manufacture of dried milk, baby foods, condensed milk, malted milk, and flavoured milk.

(f) Standardisation of utensils and equipment for use in organised dairy organisations.

(12) REVIEW NOTE ON THE PROBLEMS RELATING TO ANIMAL BREEDING

BY

DR. P. BHATTACHARYA.

I *Problems on which research work has been completed and the results obtained therefrom can now be passed on to extension Workers through the Board of Extension for general adoption*

In the case of animal breeding schemes, the results cannot be achieved within a short time. Results can be measured not annually but only by generations. Certain results have been obtained already which are partially used in extension work, but these require emphasis, so that, they may be extensively used in the field. These may be referred to as under:—

(i) The judicious use of progeny tested sires and the progeny of projeny tested sires arising from selective breeding work results in increased milk production.

(ii) Research work already completed in regard to semenoiogical studies, physiology of reproduction and other fundamental aspects of artificial insemination have made it abundantly clear that technique of artificial insemination can, under expert supervision and control, be used extensively in field work for systematic improvement of livestock.

II. *Problems on which further research is required and should be intensified.*

It will be recalled that certain problems on which research has to be intensified were suggested during the last meeting of the Working Party which was held in January, 1956. During the period of 10 months which has elapsed in between these two meetings, much progress on these problems cannot be expected. Therefore, under this item the problems which were suggested in the previous meeting have also been included along with the new items.

(1) Systematic selective breeding on the basis of progeny testing of cattle, buffaloes, sheep, goats and poultry.

(2) Fundamental research and field study of cross breeding.

(3) Investigation for evolving a technique for measuring draught capacity in bullock.

(4) Studies on the inheritance of defective characters in Indian farm animals.

(5) Study of cattle sterility, late maturity and reproductive behaviour in Indian Cattle and buffaloes

(6) Investigations on method of sterilization of scrub cows.

(7) The improvement of mutton breeds of goats and sheep.

(8) Studies on carcass quality.

(9) Defertilisation of eggs.

(10) Investigations on problems of climatology as related to animal housing and management practices.

(11) Determination of physiological Norms of different species and breeds of farm animals under various climatic conditions.

(12) Development of pig industry and training in pig husbandry.

(13) Studies on nutrition in relation to sperm production.

(14) Determination of the seasonal effect on production and reproduction in different species of Indian cattle.

(15) Performance of improved Desi Strains of fowls evolved at IVRI under different soil and climatic conditions.

(16) Recording of growth in cattle and the utilisation of growth records.

(17) Deep-freezing of semen for long term preservation.

III. *New problems on which research is to be initiated*

(1) Rotational cross breeding using at least three breeds of Indian livestock including poultry or Indian and European, to determine the value of possible heterosis for desired characteristics.

(2) Investigations on the incidence and cause of embryonic death in different species of farm animals.

(3) Physiology and pathology of reproduction in sheep and goats.

(4) Cytomorphological investigations into the spermiocytogenesis of farm animals.

(5) Egg transplantation in cows and buffaloes.

(6) Development of marketing of livestock and livestock products.

(13) REVIEW NOTE ON THE PROBLEMS RELATING TO WOOL

BY
S. S. KHOT

I. *Problems on which research work has been completed and the results obtained therefrom can now be passed on to the Extension Workers for general adoption* ;

Method of selection for non-hairy character for the improvement of the Deccani and the Bikaneri sheep.

II. *Problems on which further research is required and should be intensified.*

(i) research for evolving new breeds of general utility and for study of heritability of different characters—continuance of the approved regional sheep breeding research plan on expanded basis to obtain tangible results.

(ii) research in evolving specific breeds of sheep suited to mixed farming economy.

III. *New problems on which research should be initiated.*

(i) investigation into the critical age of flush feeding of ram lambs with the object of increasing wool and meat production in the country.

(ii) studies in losses of meat in the present methods of transport, handling, feeding etc., of sheep and goats for the meat market with the object of recommending improvement in the disposal of this valuable product.

(iii) definition, commercial evaluation and manufacturing trials on graded wools of principle breeds of sheep, with the object of laying down definite standards for classing wool as a guide to sheep development and wool marketing in the country.

(14) REVIEW NOTE ON POULTRY HUSBANDRY

BY

SHRI S. G. IYER.

General

The Poultry Committee which met on 19th and 20th October, 1956, considered about ten schemes of research and development nature and the salient points are as follows:—

(a) Processing of eggs for the conservation of quality for long periods during summer days.

(b) Long range breeding projects involving cross-breeding. recurrent reciprocal selection and selective breeding of pure bred stocks for the evolution of high laying strains.

(c) Economic feeding of Poultry.

(d) Possibilities of introducing commercial hatchery plants improved methods of table poultry production including frozen poultry.

I. *Problems on which research work has been completed and the results obtained therefrom can now be passed on to the extension Workers for general adoption.*

Grading-up

Scientific investigations under controlled conditions carried into the grading up of low producing stocks-indigenous varieties with sires of improved breeds White Leghorn and Rhode Island Red, over a period of 10 to 15 years at Izatnagar and Nagpur, have been completed. The results reveal that grading up to 5 or 6 generations is the best tool for the improvement of egg production and other economic qualities in the indigenous poultry which number round about 65 million. The improvement obtained after the first two or three generations of back crossing to pure bred sires. has been satisfactorily maintained in the subsequent generations of up-grading and in the progeny of inter crossing of graded birds. This method will indeed provide for retention of certain essential original traits in a vast majority of the Indian Poultry population.

Deep Litter

In the management of growing chicks in large establishments. from 0 to 8 weeks, rearing of chicks on floor packed with some form of litter *e.g.* wheat bhoosa, paddy straw, fallen leaves, or saw dust, at least 3 to 4 inches height and frequently turned over by fork for purposes of drying, has given beneficial results in respect of growth and rearability. The use of deep litter in poultry farming merits wide-spread use.

Season of Hatching

The season of hatching considerably influences the total annual egg production. Fundamental research and extension work have revealed that in most of the areas of the country, chicks hatched during October to February lay better than the chicks hatched too early (July-September) or too late (April-June). This finding is of considerable practical and economic importance to the poultry keepers in general.

Moulting and Feathering:—A detailed study into the phenomenon of feathering and moulting in a strain of indigenous fowl subjected to selective breeding for improvement of egg production over twelve generations, has revealed that within the variety of birds two strains differing in rate of feathering *viz.* Rapid and Slow. could be differentiated at hatching time. The rapid feathering strain has been found to be superior to the slow feathering one in respect of the different economic characters. This finding is of value in the sexing of baby chicks and in breeding for better production.

Economic Feeding:—As a result of fundamental researches in the field of poultry nutrition, both at Izatnagar and Nagpur through schemes of the Council. it is now possible to recommend the following for incorporation in the poultry ration with considerable saving in the cost of production.

(i)	Mango seed Kernal.	(20% of Cereals)
(ii)	Processed cow manure.	(8% of cereals)
(iii)	Mahuwa refuse.	(25% of wheat bran)
(iv)	Yeast sludge from fermentation industries.	
(v)	Lentil husk for what bran.	

PROCESSING OF EGG :—By defertilization of eggs at the source of collection prior to packing, it has been shown that in the case of hen eggs, eggs should be treated in water at 130°F., for 15 minutes. Studies on this subject at Izatnagar have revealed that ccagulation occurs at 130°F., in the case of duck eggs. A lower temperature of 126°F., for 10 minutes is adequate for the destruction of the embryo, retaining the quality of eggs. This information is essentially of regional importance in the States of Travancore-Cochin. Andhra, Madras and West Bengal where large-scale producers regularly transport eggs to distant places during the summer months. Further improvement in the keeping quality of eggs can be affected by immersing the heat-treated eggs either in lime water or coconut oil (eggs just immersed and removed).

DISEASES AND THEIR CONTROL:—*Salmonellosis.*— A serological variant of Salmonella has been encountered in a specialised form causing heavy mortality in chickens. The conditions was brought under control by the use of improved antigens for blood testing. This finding is of importance in view of the fact that negative findings in blood tests against the standard Salmonella pullorum antigen. may not be a conclusive finding. Tests should henceforward be carried out not only with the standard Salmonella pullorum antigen but also the variant cited above (Sal. Linchfield VI, VIII I.V.I, 2).

NEWCASTLE DISEASE :—Attemps to vaccinate baby chicks below 4 weeks of age using the present I.V.R.I. vaccine have failed to set up dependable immunity. Chickens 29 days and above in age can, however, be satisfactorily immunized with the above vaccine.

FOWL CHOLERA :—Virulent outbreaks of fowl cholera can be controlled successfully by medicating the drinking water with 16 per cent sodium salt sulphamezathine, to give a concentration of 1 in 80. The preparation should be administered for 3 to 5 days continuously with a break of one day and continued again for 3 days without this treatment, in affected flocks even 100% might die in the course of 3 to 4 days.

II. *Problems on which further research is required and should be intensified.*

(1) Cross breeding and criss-crossing for better performance with reference to crosses involving Australorp. Barred Plymouth Rock, White Leghorn, Rhode Island Red, Light Succex, New Hampshire etc.

(2) Selective breeding of indigenous poultry in the different regions for improvement of egg production.

(3) Breeding of ducks on scientific lines, for the establishment of suitable breeds and srains for augmenting egg production.

(4) Economic feeding of poultry.

(5) Investigations into cheap and durable poultry houses including use of Aluminium sheets.

(6) Study of battery systems for growing chicks as well as laying birds.

(7) Studies on the etiology and control of various corysas and respiratory ills occurring in large-scale poultry farming.

(8) Use of combined vaccine against Newcastle disease of fowl pox.

III. *New problems on which research should be initiated.*

(1) Survey of duck diseases.

(2) Commercial hatcheries.

(3) Studies into the different methods of packing eggs, using different packing materials.

(4) Develop and apply random sampling test for comparing performance of different strains of poultry.

(5) Value of antibiotic supplements in chicken rations.

(6) Physiological norms in the different classes of poultry.

(7) Conservation of green supplements for poultry feeding.

(8) Develop and apply progeny testing methods for selection of breeding cocks in the common breeds.

(15) REVIEW NOTE ON THE PROGRESS OF STATISTICAL RESEARCH IN ANIMAL HUSBANDRY.

BY

SHRI V. N. AMBLE.

I. *Problems on which research has been completed and the results of which can now be passed on to extension workers.*

Statistical research in animal husbandry is chiefly methodological and aims at assisting research workers by providing improved techniques for designing experiments and other observational programmes and interpretation of the resulting data. In the field of animal husbandry statistics it aims at providing suitable sampling techniques for securing statistics such as livestock numbers and their products, cost of production of livestock products, etc., with objectivity and precision.

For the last few years, the Statistical section of the Council has been making a critical examination of the breeding data pertaining to several herds of cattle maintained over a number of years at different government farms. These studies have provided useful information on the heritability of important milk characteristics and other ancilliary information required for formulating breeding programmes. In the course of these studies a new method of estimating the breeding worth of a sire has been evolved which has been found on an average to be four times as efficient as the widely adopted intermediate index.

Considerable progress has been made in sampling for the estimation of catch of fish. This work is no longer with Indian Council of Agricultural Research and it is proposed to write up the results already achieved to provide guidance to States for undertaking sample surveys for estimating the catch of marine fish.

II. *Problems on which further work is required and should be intensified.*

The statistical analysis of the two years' data on the pilot enquiry for evolving a suitable technique for the cost of production of milk carried out in Delhi State has given encouraging results and it has been recommended that a similar enquiry planned for Madras State should be commenced. In the new scheme it is proposed to study the possibility of ascertaining separately the cost of production of cow milk and buffalo milk and in addition also estimating the cost of fat production.

The pilot enquiry for studying breeds, milk yields and the practices relating to feeding and management of bovines is in progress in Punjab and Pepsu States of the Northern region and has given encouraging results. A similar enquiry is proposed to be conducted in the parts of Uttar Pradesh falling in the Eastern region with a view to gaining further experience. These studies will provide a suitable technique for assessing the milk production and information on connected items in a region.

The Council has been conducting an investigation on evolving a suitable technique of sampling wool both from whole fleeces as well as from commercial bales for the purpose of assessing quality attributes. The study made so far has provided useful information on the sampling technique suitable for assessing the quality of fleece, but more data on the variation between sheep are needed in order to assess the number of sheep required to be studied for assessing the average quality of a group of sheep, as is required, for example, in progeny testing. The scheme for the purpose involving study of different breeds and types of sheep including both the farm and village flocks and also aiming at studying composite samples as well as samples from different regions on the body of sheep has been prepared at the suggestion of the *ad-hoc* committee on wool sampling. This study should lead to the evolution of simple and practical method of sampling for use in the wool laboratories.

Work is in the progress on the study of lactation yields of animals with the object of devising a sampling procedure for estimating lactation yield.

III. *New problems on which research should be initiated*

Research work for evolving techniques for sampling wool for measurement of equality has made progress but the sampling of wool from commercial bales and other large lots is necessary for providing a suitable sampling method for the purpose. The Statistical Section of the Indian Council of Agricultural Research is co-operating with the Directorate of Marketing and Inspection for the investigation of this problem.

Pilot surveys are necessary for evolving methods for estimating animal products, other than milk, such as egg production, poultry, and wool.

To meet the method of scientific progeny testing of bulls for distribution, a systematic plan incorporating statistical and genetic principles and at the same time practicable for management is required to be developed.

(16) REVIEW NOTE ON ARECANUT RESEARCH

BY

SHRI B. S. VARDARAJAN

ARECANUT is a perennial crop which takes about 8 to 10 years to bear fruit. Therefore any substantial results of research can be achieved only by researches spread over a number of years.

I. *Research work completed*:—A scheme for the investigation of the stem-breaking disease of areca palm in South Kanara is the only Research Scheme that can be said to have been completed so far. It was financed jointly by the Indian Central Arecanut Committee and the Government of Madras. The Scheme was worked for about three years and when it was found out that the causal factor of stem-breaking was the exposure of the areca palm to the hot afternoon sun, the scheme was decided to be closed. But there are several other aspects of the disease awaiting detailed investigations at the Central Arecanut Research Station. As indicated above the sun scorch causes the disease first by scalding of the stem and then developing bigger patches of scorched portions on the stem. Ultimately the stem gives way before strong wind. Protecting the stem by covering with area leaf sheathes or by painting zinc white was found to be useful to some extent in protecting the initial sun scald. Once the scorching occured and the wood rotting fungi gained entrance, it was difficult to control further deterioration even though prophylactic treatment such as painting different fungicidal solutions after scooping out the dead tissues etc. were tried. But reinforcing diseased trees by tying split pieces of areca stems over the scorched portions was found to strengthen the trees considerably and enable them to withstand high winds. The Department of Agriculture in Madras has already issued pamphlets indicating the findings of the researches done on stem-breaking disease for the information of extension workers.

II. *Research work in progress* :—(1) As mentioned above researches on arecanut are essentially long range. Therefore to tackle local problems as well as to start long range studies two Regional Research Stations were started in collaboration with the concerned State Governments. One is at Ollukkara in Kerala and the other at Thirthahalli in Mysore. The following are the technical programmes of work for these Research Stations.

A. *Cultural Experiments*:

(i) Sowing in situ versus transplanting.

(ii) Optimum spacing and optimum number per acre.

(iii) Optimum depth for sowing nuts.

(iv) Germination studies.

(v) Comparison of seedlings raised from nuts collected from young middle aged and old trees.

(vi) Optimum age for transplanting seedlings.

(vii) Optimum depth of transplanting seedlings.

B. *Manurial Experiments*:

Manurial studies including green manuring under rainfall and irrigated conditions.

C. *Irrigation Experiments* :

Study of water requirements of arecanut.

D. *Harvesting Trials* : -

Influence of harvesting tender and mature arecanuts on the productivity of are canut trees.

E. Study of inter and associated crop of economic importance.

F. Control of diseases and pests prevalent in the respective regions.

The above two Regional Research Stations started functioning in 1952 and the work is in progress. Six more Regional Research Stations are proposed to be set up during the Second Five Year Plan and the studies conducted there will be co-ordinated at the Central Arecanut Research Station, Vittal, South Kanara.

(2) *Band disease of arecanut palm:*—A scheme for the investigations of Band Disease of areca palm is being conducted since 1953 under the technical supervision of the Agricultural Chemist to the Government of Bombay. A similar scheme is also being worked by the Maharashtra Association for the Cultivation of Science. Poona under the supervision of Prof. N. V. Joshi. The research on the disease is to be continued until tangible results are obtained.

(3) *Technological Research:*—The following technological Research Schemes are now in progress.

(1) Scheme for the investigations on the bye-products of arecanut by the Gauhati University.

(2) Scheme for the isolation of arecoline and testing the essential oils by the Aligarh University.

(3) A scheme for the extraction and testing of tanning characteristics by the Central Leather Research Institute, Madras.

(4) Scheme for the preparation of hard Board, insulation of wool, etc., from arecanut husk by the Forest Research Institute, Dehra Dun.

(5) Scheme for the isolation of alkaloids and pharmacological essay and testing of medicinal properties by the Andhra University.

(6) Scheme for the preservation of arecanut in fresh condition by the Travancore-University.

These Researches are being continued to its full terms.

III. *New Problems on which Research work should be initiated*

(1) *Fundamental Research:*—The fundamental problems of arecanut are to be initiated at the Central Arecanut Reserach Station under the following heads :—

(1) Collection of indigenous and exotic arecanuts

(2) Progeny studies.

(3) Blossom Biological and pollination studies.

(4) Hybridization and selection.

(5) Agronomic Research.

(6) Pests and Diseases.

The detailed programme of work will have to be drawn up after the Arecanut Specialist is appointed.

(2) *Diseases*:—

(a) Further Research on the stem-breaking disease of areca palm is to be conducted at the Central Arecanut Research, Station, Vittal.

(b) Detailed Research on the Mahali disease of areca palm has to be taken at the Central Arecanut Research Station, Vittal.

(c) Detailed investigation on the causative factors of the yellow leaf disease of areca palm in Kerala State has to be undertaken.

(d) "Anabe" or Ganoderma disease of areca palm prevalent in the Maidan parts of Mysore will have to be investigated.

(e) "Hidimundigae" disease of areca palm in Mysore State is proposed to be implemented shortly.

(f) "Stem-bleeding," Fruit cracking, Leaf dropping and Bud rot are other diseases that have to be enquired into.

3. *Manuring Scheme*.—Hitherto, no scientific manuring schedule has been fixed for arecanut cultivation and it is a long felt need in the field of arecanut research that is to be met. A scheme drawn up by a Special Sub-Committee with a minimum of 350 experiments in the regions of coastal, sub-mountain and plain areas has to be implemented to attain the above purpose.

4. *Technological Research*.—The investigation of technological aspects are now done on the laboratory scale at the various Universities. A short term scheme for investigations on alkaloids in arecanut was completed at the Presidency College, Madras in 1951-52. Other schemes are in progress at the Universities of Gauhati, Aligarh and Andhra. But as more comprehensive studies on the bye products of arecanut are required, Dr. Y. Nayuddamma, Assistant Director. Central Leather Research Institute, Madras has been appointed as Honorary Special Officer to go into the question of exploring the possibilities of the establishment of a technological laboratory. The following are the problems that could be taken up at the Central Technological Research Laboratory :—

(1) Isolation of alkaloids.

(2) Separation of alkaloids into individual components and pharmacological essay of pur entities.

(3) Bacteriostatic and Fungostatic properties of various fractions isolated.

(4) Isolation of sterels.

(5) Isolation of Tannis.

(6) Sulphiting of 'Kali liquor' (a bye-product of arecanut processing) to test its tanning content and tanning characteristics.

(7) Preparation of ink.

(8) Woolensing of arecanut fibre.

(9) Preparation of felt by mixing arecanut fibre with low jute fibre.

(10) Preparation of card and hard boards from arecanut husk.

If the findings of Dr. Nayuddamma are promising, the establishment of technological laboratory will be taken up by the Committee urgently and the results of research conducted there will be made available to the areca growers.

(17) REVIEW ON THE PROBLEMS AND PROGRESS OF RESEARCH RELATING TO JUTE

BY

DR. B. C. KUNDU.

(1) *Problems on which research work has been completed and the results obtained therefrom can be passed on to the extension workers for general adoption.*

The various problems with regard to the improvement of yield and quality of jute on which research work is being carried out at the Jute Agricultural Research Institute broadly include (1) breeding of improved varieties (2) improvement in the cultural and manurial practices (3) improvement in the retting technique and (4) evolution of suitable control measures, against diseases and pests. Although important findings of practical value have been obtained at the Jute Agricultural Research Institute as a result of sustained work on these problems, further researches have to be continued on all these aspects for effecting still further improvement.

The important research results of practical value which can be passed on to the extension workers for general adoption and which are already being demonstrated in the 7 extension centres of the jute Agricultural Research Institute are enumerated below :—

Improved strains of jute

A number of improved strains of C *capsularis* and C. *olitorius* have been evolved by the Jute Agricultural Research Institute to suit different environmental conditions of the jute growing areas of the country. The important ones are :

C. Capsularis–	JRC– 212
	JRC– 321
C. olitorius	JRO– 632
	JRO– 753
	JRO– 620

Increased yield of about two maunds per acre for *capsularis* and four maunds per acre of *olitorius* over local types have been obtained by the use of improved strains.

Of the *capsularis* strains JRC-212 is a late type giving high yield and better quality of fibre. The strains JRC-321 is a quick growing early maturing type and yields fibre of very good quality. This strain is highly suitable for low-lying areas where it can be sown early and harvested early for double or triple cropping purposes. Among the *olitorius* strains, JRO-632 and JRO-753 are the highest yielders and JRO-620 is reputed for its high yield and excellent fibre quality.

Improved cultural practices

Row cropping of jute:—Growing jute in lines is recommended as against the traditional method of broadcasting. In broadcast sowing the process of weeding and thinning operations which require every inch of the land to be covered by hand labour are very expensive ; about 45 to 60 men are required per acre and this accounts for 40 to 50 per cent of the total cost of production. The cost is much reduced when jute is sown in lines as interculture is possible with a hand wheel hoe. In line sowing one hand operation for weeding and final thinning in lines may be given when the plant height averages about 9 inches ; about 10 to 12 men are required per acre to complete this operation. For interculture between rows one wheel hoe may be used three to six times at suitable intervals till the plants are 3 to 4 feet high. One man should be able to wheel hoe about ½ to ¾ acre a day.

Row cropping reduces seed rate by about 50 per cent, ensures uniformity of crop, increases the yield by about 12 to 20 per cent over broadcast, reduces cost of production by about 20 to 30 per cent and tends to improve the quality of fibre. To facilitate sowing in lines, the Jute Agricultural Research Institute has evolved a suitable jute seed drill in collaboration with a local firm which has already become popular with the growers.

Manurial practices

Application of 20 to 40 lb. of available nitrogen per acre from both organic and inorganic sources is recommended for jute. A dose of 40 to 80 maunds of compost per acre (50% of the N is expected to be available to the crop) at the time of land preparation followed by 50 to 100 lb. of ammonium sulphate as top dressing when the crop is about one month old is recommended. Application of potash has been found to check disease to an aprreciable extent thereby contributing towards increase in yield. 50 lb. of muriate of potash per acre is recommended. In acidic soils, lime should be applied as basal dressing at the rate of 3 to 6 maunds per acre at least 3 to 4 weeks before sowing. Depending on the fertility of soil the yield has been found to increase by 30 to 200 per cent per acre by judicious application of manures.

Double cropping with Jute

Jute sown for fibre production occupies the land only about four months and it is possible to raise the second crop or sometimes even a third crop from the same land in the same year. Such a programme of double or triple cropping is possible in low and mid lands where rains start early or where irrigation facilities exist. In such areas *capsularis* jute may be sown early and after the harvest of jute a crop of transplanted paddy often followed by a third crop of pulses can be raised. In high lands where sowings are late the land is usually cropped with late varieties generally *olitorius* jute.

which is followed by crop of potato or pulses. Being a bast fibre crop which can be harvested at any stage without complete loss of yield, jute offers an advantage over grain crops which can only be harvested after the maturity of grain. In a programme of cropping paddy lands with jute as an earlier crop the transplantation of paddy need not be delayed for the maturity of the jute crop. Experiments conducted in the Jute Agricultural Research Institute have shown that economical yield of fibre from the first crop (jute) is obtained when the crop is allowed to stand for a minimum period of about 90 days before transplanting paddy. Date of sowing and harvest of jute may, therefore, be so adjusted that transplantation of paddy, the time for which is fixed for each areas is not delayed. It has been found that on an average yield of *capsularis* jute is 11 to 12 maunds per acre by growing it only for a period of 90 days and that of paddy ranges from 20 to 25 maunds per acre.

Results of double cropping experiments have shown that it is possible to maintain or even increase the paddy yields in lands where jute is grown as the first additional crop. The nutrients which are exhausted from the soil during the growth of the crop is more or less replenished by the large amount of leaf fall. The immature plants which are thinned out during intercultural operations and also the non-fibre producing portions (twigs) may also be added to the soils. The fallen leaves along with these would normally maintain the nitrogen status and increase considerably the available phosphate status of the soil.

Proper stage of harvest

Jute should be harvested when the plants are in small pod because at this stage the best combination of yield and quality is obtained.

Improvement of retting technique

The bundles for steeping should be about 8 inches in diameter and laid on the ground for 2 to 3 days. During this period the adhering leaves drop off and the tissues of the stem shrink and the cells rapture. This facilitates the entry of micro-organisms into the stems when steeped in water. For weighing down the bundles in the 'jak' (platform of jute bundles laid flat in water), use of earth banana stems or freshly cut log of mango and bel should not be used. These are rich in tannin and the tannin coming in contact with the iron of the retting water discolours the fibre. By using acquatic plants as covering material, the jaks may be weighted down by stones, bricks or dry logs etc.

Jute bundles have been found to ret better when steeped at a depth of 6 to 9 inches, in slow flowing clear water. In jute the top portion rets earliest and the bottom last, resulting in ununiform fibre. Jute will ret more uniformly when the bottom of jute bundles are kept standing in water 1 ft. to 2 ft. deep for 2 to 3 days before steeping the whole bundle.

Extraction

The method of extraction of fibre separately from single retted sticks as against usual bundlewise method, though slightly costlier, produces fibre of better quality and minimises wastage of fibre.

Improvement of Shyamla colour of jute

Jute plants contain tannin. When retted, the tannin from the stems comes into solution and with the dissolved iron of the retting water produces a blackish colour ; the fibres thus get a grey black colour, which is usually known as Shyamla colour of jute. The colouration is more when banana stems, or freshly, cut logs of mango or bel are used. If plants are several times steeped in the same retting tank the fibres from the later charges become more and more coloured. This Shyamla fibre fetches comparatively less price. It has been found that this colour can be removed by treatment with mineral and organic acids. The strength of the fibre is lowered when treated with mineral acids but with organic acids it is not so. The cost of treatments with organic acids is very high. It has also been found that if treated with 2% tamarind extract, the colour of the fibre can be improved. Technological tests reveal that the fibres treated with tamarind extract have slightly better quality ration than that of the untreated fibres. The cost comes to about -/12/- per maund including the cost of labour.

Control of disease of jute

The main diseases of jute are (1) stem-rot caused by the fungus *Macrophomina phaseoli,* (2) *Anthracnose* due to *Colletotrichum* sp. and (3) soft-rot caused by *Sclerotiumrolfsii.* The following recommendations made to control the diseases caused by the M. phaseoli and *Collectotricum* sp.

(a) Seed treatment with organo-mercuric compounds like Agrosan GN (at the rate of 3 to 4 tollas per seer of seed) when the soil is comparatively free of the pathogen but seed is infected.

(b) when the soil is highly infected—

- (i) rotation of paddy for two years successively,
- (ii) application of lime (usually 8 maunds per acre) according to necessity,
- (iii) application of potash, usually 20 lb. of muriate of potash per acre, and
- (iv) removal of infected jute stubbles after deep ploughing.

(c) To avoid secondary infection, (i) early sowing with the first norwester showers and (ii) timely weeding and proper thinning.

(d) To check secondary infection of stem-rot (i) spraying of Bordeaux mixture 4:4:40 (copper sulphate (4 lb): lime (4 lb): Water (40 gallons) and/or copper-oxide or collodial copper ½ per cent. For checking soft-rot occasional mulching of the soil and spraying of collodial copper on ground or copper sulphate 0·1% at the base of the stem are recommended.

Control of pests of jute

The important pests of jute are indigo caterpillar, jute semilooper, hairy caterpillar, jute stem weevil or jute apion, mites, Pseudococcus and jute stem-girdler. The following control measures are recommended:—

(a) Indigo caterpillar (*Laphygma exigua*), Jute smilooper (*Anomis Sabulifera* and hairy caterpillar (*Diacrisia obliqua*) spraying of 0·5% to 0·75% wettable DDT, Endrin 0.03%, Folidol 0·003%.

(b) Jute stem weevil or jute apion (*pion corchori*)—Spraying or dusting of B.H.C. or D.D.T. as prophylactic measures.

(c) Mites (Hemitarsonemus latus White mite) *Tetranychus biocultus*; Red mite)—Dusting of lime sulphur 3 · 1 at an interval of 24 hours, operation to be repeated if necessary.

(d) Pseudococcus—Spraying of 1·0% to 1·5% nicotin sulphate.

(e) Jute stem girdler (*Nupserha bicolor ssp. postbrunnea*)—*Capsularis* jute is resistant to this pest, while *olitorius* is highly susceptible. Measures like (i) growing of *capsularis* jute in highly infected areas (ii) removal of affected plants during thinning operation, (iii) destruction of eggs by removal of apical portion along with the rings of the attached plants before the leaves dry up and (iv) removal of small pieces of stem containing the dormant larva inside. found on the surface of the soil after the harvest of the jute.

II. *Problems on which further, research is required and should be intensified. These problems are already in the programme of the J.A.R.I.*

Botany

(A) *Breeding and Genetics* :

(i) Wider collection of varieties and types both indigenous and exotic including wild species of *Corchorus* for isolation of promising strains and breeding materials.

(ii) Breeding improved strains :—

(a) Selection

(b) Hybridization :—

(1) Intervarietal

(2) Interspecific (Induction of polyploid and interspecific hybridization in jute).

(c) Induction of mutations by X-irradiation.

(d) Breeding for disease resistance.

(e) Yield and quality test of the breeding materials.

(f) Small scale yield trials in cultivators' fields.

(g) Isolation and maintenance of genetic strains

(h) Study of the inheritance of characters.

(B) *Multiplication of improved strains* :

Anatomy

(i) Study of the structure of the fibre.

(ii) Study of the relationship between the structure and the quality of fibre.

- (iii) Effect of fertilizers on the formation and development of fibres.
- (iv) Effect of growth and maturity on the structure and quality of fibre.
- (v) Study of formation of fibre layers in relation to plant height and base diameter.
- (vi) Indentification of various fibre samples.

Cytogenetics

- (i) Interspecific hybridization and study of the factors involved in incompatibility between *C. capsularis and C. olitorius* in crosses.
- (ii) Cytogenetical studies on colchicine treated and X-irradicated jute including wild types.
- (iii) Cytology of wild and cultivated types of *C. capsularis* and *C. olitorius.*
- (iv) Pollen grain studies.

Physiology

- (i) Root system in different jute species.
- (ii) Variation in growth and pattern of unit structures contributing the yield of fibres.
- (iii) Evolution of a suitable methods for determining the fibre percentage from the standing plant in order to include the application of fibre percentage value as a third criterion in addition to plant height and base diameter for selection work in jute breeding.
- (iv) Studies on the physiology of growth in different species and varieties of jute with special reference to fibre yield.
- (v) Nature and range of flowering and seed formation in-different varieties of jute.
- (vi) Effect of vernalization and photoperiods on the initiation of the reproductive phase.
- (vii) Salt tolerance.
- (viii) Linear growth of internodes and their distribution along the stem.
- (ix) Growth in relation to stalk and foliage.
- (x) Sand culture experiments at different nutritional levels and trace elements.

Agronomy

- (i) Intercultural experiments and row cropping of jute including spacing between plants. Further improvement of the seed drill and evolving a suitable wheel-hoe which can be used under moist conditions.
- (ii) Manurial trials.
- (iii) Triple cropping and double cropping with jute as the first crop.
- (iv) Date of sowing and period of growth.

(v) Green manuring.

(vi) Manurial trials in cultivator's plots in the States.

(vii) Operational cost of jute cultivation.

Chemistry and Microbiology

(i) Analysis of soils and manures for their chemical and mechanical constituents.

(ii) Soil exhaustion studies.

(iii) Development of methods for determination of soil nutrients for advisory work in connection with manuring etc.

(iv) Role of soil conditions regarding susceptibility to diseases.

(v) Attempts to find out maximum production of jute under the influence of nitrogen.

(vi) The influence of soil conditioners on soil textures.

(vii) Study of retting processes and their improvement.

(viii) Improvement of the colour of fibre.

Mycology.

(i) Study of the stem-rot *fungus Macrophomina phaseoli.*

(ii) Study on the effects of environmental factors on secondary infection due to *Macrophomina phaseoli.*

(iii) Study of the biology of pathogens other than *Macrophomina phaseoli viz.* (a) *Colletrotrichum* sp. causing anthrachnose of jute. (b) *Sclerotium rolfsii* causing soft-rot and (c) Fusarium sp. causing wilt, etc.

(iv) Investigations on chlorosis in jute.

(v) Investigations on the methods of control of diseases

(vi) Storage of seeds.

Entomology

(i) Studies on *Nupserha bicolor* ssp. *postbrunnea*. jute girdler pest.

(ii) Studies on *Pseudococcus filamentosus* var. *corymbatus*.

(iii) Studies on *Apion corchori,* jute stem weevil.

(iv) Studies on *Laphygma exiqua* (indigo caterpillar). *Anomis sabulifera* (jute semilooper), *Diacrisia obliqua* (jute hairy caterpillar).

(v) Studies on *Hemitarsonemus latus* (white mite). *Tetranychus bioculatus* (red mite). *Heterodera marioni* (nematode).

(vi) Studies on minor pests.

(vii) Investigations on the control of pests and mites.

(viii) Investigations on the residual effects of insecticides on soils.

Extension

(i) Conduction of demonstrations of improved methods of jute cultivation in cultivators' plots in the different extension centres.

(ii) Collection of data on cost of cultivation.

(iii) To undertake socio-economic studies of the jute cultivators in various centres (in collaboration with Statistics Section).

(iv) Dissemination of the results of research by holding exhibitions, meetings, distributing pamphlets containing information on improved methods of cultivation in popular language, discussion, etc.

(v) To act as liaison between the cultivators and the research workers.

III. *News problems on which research work should be initiated.*

(i) Opening of Zonal research stations with a view—

(a) To select suitable varieties for a particular adaphoc-climatic group.

(b) To find out suitable cultural practices and cropping programme for a particular edapho-climatic group.

(c) To study and control the disease and pests for a particular climatic group.

It may be mentioned here that the Government of India on the recommendation of the Indian Central Jute Committee sanctioned a sum of Rs. 15·7 lakhs for the establishment of six research-*cum*-developmental substations in the five jute growing States in India as under :—

West Bengal—2 (one in North Bengal, one in D. V. C. irrigated areas).

Assam—1

Bihar—1

Orissa—1

U.P.—1

These farms have not yet been started.

In the last meeting of the Indian Central Jute Committee held on 10.11.56 it has been decided to open three substations, one each in Assam, Orissa and U.P.

(ii) Extensive manurial-*cum*-varietal trials to find out manurial schedule for jute varieties for particular localities in the different jute growing regions of India. Recently one scheme in this connection was submitted to the Government of India for consideration.

(iii) Production of desirable mutations by irradiation with X-rays and radioactive isotope. Recently the Indian Central Jute Committee has sanctioned a scheme submitted by the Bose Research Institute, for undertaking work on the irradiation of jute by radioactive isotopes.

(iv) Detailed nutritional investigations on jute by tracer technique.

(v) Detailed study on the developmental changes in the structure of jute fibre during their growth processes and also the structure of different types of jute fibre in relation to their quality by electron miscroscope.

(iv) Study of infiuence of different factors like temperature humidity, etc. on various pests of jute. The study has much practical importance and will not only help in interpreting many field data but also is important from the point of view of the study of eqidemiology and toxicology with reference to humidity temperature.

Note on the problems relating to Substitute Fibres

The Substitute Fibre Section of the Jute Agricultural Research Institute with one Assistant Botanist and two Research Assistants has within the short period of its existence made very satisfactory progress. Two improved strains of *Hibiscus sabdariffa* var. *altissima* —one for high fibre yield and other for non-bristle character of the stem have been evolved. In H. *cannabinus* a large number of selections for high fibre yield and resistant to disease have been made. The Section has also been able to evolve an improved high yielding type of sunn-hemp which has given satisfactory performance in trials conducted in the different States. It is felt that this Section should be strengthened with additional staff, *viz.* One Botanist, One Agronomist and Two Research Assistants to cope with the increased volume of work.

Investigations on the following fibre plants are being carried out at the Jute Agricultural Research Institute with a view to ascertain their possibilities as jute substitute from agro-botanical, economic and technological points of view :—

A. BAST FIBRES:

Hibiscus cannabinus (mesta)
Hibiscus sabdariffa (roselle) and other species of *Hibiscus*.
Crotalaria Juncea (Sunn-hemp)
Boehmeria nivea (ramie)
Cannabis sativa (hemp)
Linum usitatiss imum (flax)

MINOR FIBRES:

Sida rhombifolia
Urena lobata and *U. sinuata*
Abutilon spp.
Malachra capitata
Abroma augusta

B. Hard fibres:

Agava spp. (Sisal)
Sanseviera spp. (Bowstring hemp)
Furcraea sp.

Botanical and Agronomical studies:

(i) Collection of propagating materials such as seeds, suckers, bulbils, slips, etc. as the case may be, relating to the fibre plants under study.

(ii) Studies on breeding and genetics of *Hibiscus* cannabinus and *H. sabdariffa.*

(iii) Agronomical studies (date of sowing, seed-rate, spacing trial, manurial trials. etc.) on *H. Cannabinus* and *H. sabdariffa.*

(iv) Studies on Sunn-hemp, Linseed, Ramie, Agave and Furcraea and other fibres.

(v) Seed multiplication.

ANATOMICAL AND CYTOLOGICAL AND PHYSIOLOGICAL STUDIES OF HIBISCUS SPP. BOEHMERIA NIVEA, CROTALARIA JUNCEA AND AGAVE SPP.

Studies on the diseases and pests of various substitute fibre crops. Research on Ramie.

The fibre obtained from Ramie plant (*Boehmeria nivea*) is the strongest and finest of all the vegetable fibres and the quality of this fibre is much superior to jute, cotton, flax, etc. This fibre has got manifold uses in textile industry ; its most important use is for the manufacture of various superior qualities of clothing materials. It is also mixed with cotton, rayon, wool, hemp and other fibre of greater elasticity. There is a growing demand for ramie fibre in the world market. At present the supply from India is practically negligible. Although its cultivation on commercial scale has not received proper attention, there is ample scope for the development of ramie in this country. In India the terai belt running along the N. E. India has the typical soil and climate conditions for ramie cultivation where it is found to be growing under natural conditions.

Sometime ago the Government of India considered this aspect and asked the Indian Central Jute Committee to submit a scheme for the conduction of research work on ramie. Ramie growing areas were surveyed and a scheme amounting to Rs. 5·50 lakhs for the first year and Rs. 1·85 lakhs for the second year was submitted by the Director, Jute Agricultural Research Institute of the Indian Central Jute Committee at the instance of the Government of India. The scheme was later modified and finalised after discussion with the Agricultural Commissioner with the Government of India. but the proposal was later dropped by the Government of India.

Some research on a modest scale is at present being carried out at the Jute Agricultural Research Institute but in view of its potentialities it is essential that detailed research on all aspects of ramie cultivation and production of fibre should be undertaken.

Research on Sisal

India requires more than 60,000 cwt. of sisal and manila fibre. True sisal is usually obtained from *Agave sisalana.* In India certain quality of fibre is also obtained *Agave cantala* which is locally known as Aloe fibre. Production of sisal fibre in India is very small and a large quantity is imported from outside (Tanganyika, Kenya and Philippines) for the use of marine cordago though abundant possibilities exist in this country for the development of this fibre crop. It is grown in small plantation scale in some areas of Bombay, Ahmedabad, Madras, Hyderabad, Bihar and Orissa. In this connection a scheme costing Rs. 102 lakhs recurring (with 3·8 lakhs non-recurring for the first year) for the establishment of a sisal research station at Barma, Orissa with a view to improve the yield and quality of fibre was submitted to the Ministry of Agriculture, Government of India. This scheme was, however, not sanctioned.

Some research on a very modest scale is at present being carried out at the Jute Agricultural Research Institute. It is felt necessary that detailed research on all aspects should be undertaken.

(18) REVIEW NOTE ON SOIL SCIENCE

BY

DR. V. SUBRAHMANYAN, *Chairman, Soil Science Committee.*

1. *Problems on which research work has been completed and the results thereof can be passed on to Extension workers.*

In scientific research fresh problems always follow in the wake of those which are studied, so it is difficult to state whether any problem has been completely studied.

Investigations sponsored by the Soil Science Committee are helping to throw light on (a) effect of continued application, at different levels, of certain fertilisers on soils and crop yields ; (b) losses or soil fixation of certain fertilising ingredients as now applied ; (c) inter-relation between different fertilisers and (d) response to new types of fertilisers and new methods of application of fertilisers. The place of minor elements in the nutrition of different types of crops and the effects of their application both to the soil and by foliar sprays are proving to be fruitful lines of study. Correlation between soil composition, availability of fertilising ingredients and plant response is a complicated field of study, but some of the programmes are bound to throw fresh light on certain aspects of the subject. Rapid analysis of available plant nutrients quick assessment of fertiliser requirements, which are in progress, are also bound to yield useful results. The place of certain types of green manuring crops as intermediaries in increasing the availability of certain fertilising ingredients will also prove fruitful.

As things stand, there is growing evidence to show that there is need for creation in regard to the heavy application of nitrogenous fertilisers unless there is balanced addition of other essential major and minor fertilising ingredients. Added organic manures or green manures, crops are best combined with such fertilisers and help not only to increase yield but also to protect the soil from rapid exhaustion.

II. *Problems on which research work is already in progress but requires intensification*

There is already a large amount of work on new types of fertilisers, singly and in combination. The results in a number of places have been erratic, but this has not been fully explained. Thus, in the case of urea, there may be pronounced loss through leading or volatilisation as ammonia under certain conditions. This deserves to be followed up intensely with regard to both wet and dry cultivated crops. A coordinated programme of work on the reclamation of saline and alkaline soils has just been started and the programme should be intensified. Further studies on the interrelation between certain fertilising ingredients and also the correlation of plant analysis with soil composition and fertiliser application deserve to be taken up.

Several programmes on nitrogen fixation—both in the soil and through the agency of organisms have been, in progress, but they have not yet taken us very far. An integrated study with due assessment of quantitative returns is needed and that programme will soon be initiated.

III. *New problems on which research should be initiated*

There is growing recognition of the importance of soil organic matter as a factor concerned with maintenance of good response to mineral fertilisers. At the same time, there is increasing realization of the difficulty in maintaining a fairly high organic matter level in tropical soils because of the continued destruction during all seasons of the year. We should be able to arrest, if not stop, the destruction when there is no crop on the soil and speed up the changes in the presence of the crop. This may not offer easy solution, but the experience gained in the case of plantation crops may be worthy of extension to field crops.

Lately, there has not been adequate amount of interest in 'problems relating to utilisation of sewage and composting. There is need for keeping a check on every type of wastage and ensuring the most efficient utilisation. We have so far, had only partial successes in these lines. More work is needed and they will in due course bring useful returns. A fruitful line of getting additional information about soil and fertiliser requirements of crops would be select areas where consistently high yields have been obtained during the past few decades. Whether they are on Government or private farms, these selected areas would deserve thorough study. They may reveal information that would lead to fresh developments. The basic requirements of a variety of crops are known, but what contributes to high growth apart from seasonal factors has not yet been fully understood.

There are certain enigmatic features about the absorption of certain apparently unimportant constituents by different crops. Thus, while it is fairly well recognized that the soil under a certain depth of water brings into solution, stabilises and provides certain essential nutrients to the rice plant we do not yet know what they are. The whole secret of the apparently extravagant water requirement of the rice plant seems to be there. Intensive programmes of study in this line are bound to yield fruitful results.

Another line which is now attracting attention and on which more work is needed is that of possibility of evolving new varieties conforming to certain nutritional requirements. Thus, breeding of rice varieties for higher protein and calcium contents would be a very valuable line of study. Similarly, the raising of new varieties of wheat with high gluten content would also be very useful. Some Crops like Ragi (*Elevenic Coracana*) take up abnormal quantities of Calcium, though they do not respond much to lime. The significance of such features would deserve thorough study. Such crops are bound to exhaust the soil and eventually give very low yields if certain constituents are not made up in suitable forms. The requirements of minor element of all types of crops would deserve careful study.

(19) REVIEW NOTE ON THE PROBLEMS RELATING TO OILSEEDS

BY

DR. R. SANKARAN.

I. *Problems on which research work has been completed and results can be recommended for general adoption.*

(1) *Breeding* :—

A scheme for research on groundnut in Mysore State was in operation from April 1944 to March 1952. Improved strains of groundnut superior to the local ones were evolved under the scheme.

A scheme for the improvement of castor crop in Hyderabad State was in operation from August, 1934 to March 1950. The objective was to evolve strains possessing high yield and high oil content suitable for cultivation in Hyderabad as well as castor growing regions of India. Certain improved strains of castor (HC-1, HC-2, HC-3 and HC-4) were evolved which proved about 25% superior in yield and 3 to 5% superior in oil content to the local strains. Printed pamphlet on the practical results achieved in the All India Castor Improvement Scheme Hyderabad was published.

(2) *Agronomy*

A scheme for manurial experiment with groundnut cake and castor cake in Hyderabad State was in operation from 1943 to April 1948. The objective was to discover which of these two cakes will be beneficial and economical in giving increased yields of the principal food and cashcrops and also to ascertain the optimum dose of nitrogen to be applied to various crops. The results of the application of these oil cakes to cotton, paddy, wheat, sugarcane and tobacco were published as a popular leaflet.

(3) *Pests and diseases*

A scheme for research on pests and diseases of groundnut in Madras State was in operation from 1943 to 1947 with the object of finding out practical control measures against leaf roller (*Stomobteryx nerteria*) and *Tikka* leaf-spot disease (*Cercospora*) of groundnut. The results of practical value obtained from this investigation was published as a leaflet.

A scheme to carry out large scale trials with the insecticides and fungicides for the control of leaf roller and fungicides for *tikka* leaf spot disease of groundnut in Madras was in operation from July 1951 to June 1953. The results of practical value obtained from the scheme were published as a leaflet.

A scheme for research on pests and diseases of castor and other oilseed crops in Hyderabad was in operation from 1943 to June 1947. A note on the economics of the control of castor semi-looper was prepared for circulation.

A scheme for research on pests and disease of mustard and sesamum in Uttar Pradesh was in operation from 1st August, 1943 in two parts. The mycological part terminated on the 30th June 1947 and the entomological part on 30th June 1951. The object of the scheme was to discover remedial measures for the damage caused to castor and sesamum crops by their major pests and diseases and thereby increase the yield and improve the quality of those crops.

A scheme for research on pests on linseed in Madhya Pradesh and to evolve effective control measures was put into operation on 2nd November 1943 and terminated on the 21st August 1954. A study of the life history of the pests namely, linseed gall-fly and the linseed cater-pillar and the comparative efficacy of the various agricultural, mechanical and chemical methods of control was made.

A scheme for research on pests on safflower in Bombay was in operation from April 1945 to June 1950 with the object of finding out practical control measures of safflower aphid. The practical results achieved from the scheme were published as a leaflet.

II. *Problems on which further research is required and should be intensified.*

It will be seen from Section I above that only two schemes for breeding of improved varieties of oilseeds have been completed. Among the current schemes, there are 24 on breeding, 3 on agronomic research and 6 on pests and diseases. The surest method of increasing yield of oilseed crops in India is the use of improved strains which are capable of giving higher yields (10 to 15%) than the unselected local varieties under cultivation. Another method is the adoption of improved agronomic practices such as time of sowing, seed-rate, inter-culture, manuring, irrigation etc. Agronomic research on each of these factors mentioned above will have to be undertaken with a view to recommend a combination of the optimal Agronomic treatments which will contribute towards the maximum yield per unit area. It is well known that yield of various oilseed crops in India is very low and has to be considerably stepped up. Therefore, further research has to be undertaken on the evolution of improved varieties as well as the determination of optimal agronomic practices and these two aspects of research should be intensified.

In addition to the applied research, it is also necessary to initiate fundamental research on various agricultural sciences such as cytogenetics, physiology etc. The research should be intensified in a properly co-ordinated manner on the basis of soil-climate-variety complex. This is sought to be achieved through the proposed establishment of Regional Research Stations for oilseeds on an all India scale. The main Regional Research Station proposed to be set up will work on cytogenetics, plant breeding, plant physiology, plant pathology, entomology, soil chemistry, agronomy and statistics whereas the out-stations will confine to plant breeding, agronomy, plant pathology and entomology. As the Indian Central Cotton Committee and the Indian Council of Agricultural Research have accepted the establishment of Regional Research Stations on the above lines, wherever the stations chosen for cotton, oil-seeds and millets happen to be located at the same centre, a Composite Regional Research Station for all the three commodities will be established as a single organisation.

INDIAN CENTRAL OILSEEDS COMMITTEE

AGRICULTURAL RESEARCH SCHEMES IN PROGRESS

Serial Number.	Name of the scheme	Object of the scheme	Period & Venue.
	1. FUNDAMENTAL RESEARCH SCHEMES		
	DELHI		
1	Scheme for cytogenetical studies on some oilseed crops at the I. A. R. I., New Delhi.	Under the scheme it is contemplated to take up work on mustard, sesamum and linseed.	5 years I. A. R. I.
2	Scheme for the Physiological investigations on auto-tetraploids of some oilseed crops at the I. A. R. I., New Delhi.	It is proposed to work on the following lines:— (i) Study of the causes of low germination of tetraploid seeds. (ii) Growth analysis of diploids and tetraploids of brassica, sesamum and linseed. (iii) Factors concerned with oil production by diploids and tetraploids will also be investigated.	5 years I. A. R. I.
3	Scheme for inducing mutants with desirable economic characters in til, and rape and mustard by X-rays, at Bose Institute, Calcutta.	The object of the scheme is to evolve economic mutants in the oilseed crops especially seasamum and Brassica and to obtain data of a fundamental nature regarding the mutability, cytology, origin and inter-relationships.	3 years Extended up to 31st March 1957. Calcutta.

Serial Number.	Name of the Scheme	Object of scheme	Period & Venue
4	Scheme for physiological research on linseed at the Institute of Plant Industry, Indore.	(i) The study of the mineral nutrition of linseed under field and pot conditions to determine the mineral requirements of the crop. (ii) The study of the effect of trace elements especially Boron copper on the growth of the crop under field and pot conditions. (iii) The effect of spacing and inter-cropping with wheat on the growth and yield of linseed.	5 years I. P. I., Indore.
5	Scheme for research in the physiology of groundnut and sesamum at the Central Tobacco Research Institute Rajahmundry.	Under the scheme the following items of work are contemplated: (i) Physiology of the pod formation in groundnut. (ii) Dormancy studies in different varieties of groundnut.	3 years Rajahmundry.
6	Scheme for research on Genetics and breeding of mustard at the College of Agriculture, Banaras Hindu University, Banaras.	It is proposed to undertake work on the following lines:— (i) Study of variation in the range of self fertility in different varieties and classes of mustards. (ii) Isolation of lines of different levels of self fertility. Self sterile lines to be isolated through bud-pollination. (iii) Inter crossing different stocks for genetics analysis. (iv) Study of quantitative expression of inter-crossing in order to measure the extent of hybrid vigour and assess the possibilities of its utilisation. (v) Isolation and use of male sterile plants for raising hybrid seed. (vi) Utilisation of hybrid generations produced under item 3 & 4 for early testing and breeding of superior strains.	5 years Banaras.
		MADRAS	
7	Scheme for research on cytology of groundnut.	The object of the scheme is to undertake cytological studies on groundnuts.	5 years Coimbatore.
8	Scheme for research on the physiology of the groundnut.	It is proposed to undertake work on the following items:— (i) Nutritional studies. (ii) Pre-treatment of seeds. (iii) Dormancy studies. (iv) Duration studies. (v) Drought resistance studies. (vi) Trace elements.	5 years Coimbatore.

Serial Number.	Name of the Scheme	Object of the scheme	Period & Venue
	2. BREEDING SCHEMES		
	ANDHRA		
1	Scheme for increasing the production of oilseeds in Rayalaseema area of Andhra Pradesh.	It is proposed to work on the following items:— (i) Introduction and acclimatisation of varieties. (ii) Selection of single plants from ryots' bulk and promising exeotic varieties. (iii) Trial of strains already evolved. (iv) Hybridization. (v) Seed rate experiments. (vi) Cultural experiments. (vii) Manurial experiment etc.	2 years Anantapur.
	ASSAM		
2	A five year scheme for conducting research on brassica.	The object of the scheme is to evolve improved strains of Brassica in Assam. The work also includes cultural, manurial and rotational experiments.	6 years Jorhat.
	BIHAR		
3	Scheme for the evolution of high yielding varieties of oilseeds in Bihar.	Under the scheme it is proposed to evolve improved strains of linseed, mustard as the main crops and castor and til as subsidiary crops.	6 years Sabour.
	HYDERABAD		
4	Scheme for the establishment of oilseeds sub-stations at Raichur and Parbhani.	The object of the scheme is to evolve best yielding varieties of castor suitable for cultivation in these areas.	5 years Raichur and Parbhani.
5	Scheme for evolving breeding techniques for castor.	The object of the scheme is to evolve a breeding technique for self sterile castor.	5 years Himavatsagar Farm.
	MADRAS		
6	Scheme for intensive breeding of groundnut.	The object of the scheme is to evolve improved strains superior to the existing improved ones.	5 years Tindivanam.
7	Scheme for the improvement of "Pollachi Red" bunch variety of groundnut in Madras State.	The chief objective of the scheme is to evolve groundnut strains with high yield, high oil content and dormant nature of seed suited to the Pollachi tract.	5 years.

Serial Number.	Name of the Scheme	Object of the scheme	Period and Venue
		Madhya Pradesh	
8	Scheme for research on rape and mustard.	The object of the scheme is to evolve improved varieties of rape and mustard combining in them high yield and high oil content to suit the different soil and climatic conditions.	3 years Jagadalpur.
		Pepsu	
9	Scheme for the improvement of oilseed crops (besides groundnuts).	The object of the scheme is to find out types giving high yields, with high oil content and carrying resistance to frost, cold and aphids.	5 years Farid Kot Farm. Extended for 3 years.
		Punjab	
10	Linseed breeding scheme—Kangra.	The object of the scheme is to evolve improved strains of linseed, sesamum and castor.	6 years Kangra. Extended for 3 years more.
11	Scheme for the improvement of groundnut crop.	Under the scheme the following items of work are contemplated:— (i) Acclimatisation of exotic varieties and isolation of desirable strains. (ii) Hybridization to synthesise economic characters and produce disease-resistant types. (iii) Agronomic experiments, and (iv) Chemical work.	5 years Samrala.
12	Scheme for the improvement of Brassica crop.	Under the scheme research is to be undertaken to evolve improved strains of self-sterile forms of brassica *viz.*, brown sarson and toria. Manurial trials and experiments on seed rate and time of sowing will be conducted on these crops.	3 years Gurgaon. Extended for 3 years
		Saurashtra	
13	Scheme for research on groundnut.	The object of the scheme is to evolve races of the crop with high yield, high oil content, high shelling outturn low free fatty acid content, shorter duration and resistance to drought and pests and diseases.	5 years Junagadh.
14	Scheme for the improvement of seasum crop in Saurashtra State.	The object of the scheme is to obtain high yielding strains with high oil content.	5 years.
15	Scheme for the improvement of castor crop in Saurashtra State.	The object of the scheme is to obtain high yielding strains with high oil content.	5 years.

Serial Number.	Name of the Scheme	Object of the Scheme	Period and Venue
		Uttar Pradesh	
16	Scheme for research on oilseed crops.	The scheme envisages work on the improvement of linseed, mustard, groundnut, til and castor.	5 years. Extended for 5 years.
		3. AGRONOMIC SCHEMES	
		Delhi	
1	Scheme for agronomical studies at I.A.R.I.	The programme of work is given below:— (i) Large scale testing of varieties under different soil conditions (ii) Mixed cropping studies of oilseeds with cereal or legume crops, and, (iii) Standardization of manurial and cultural schedules for new strains and their influence on soil as affecting the succeeding crops.	5 years I. A. R. I.
		Madras	
2	Scheme for devising improved machinery driven by bullock and power.	The scheme aims at devising a suitable machinery driven both by the bullock and tractor for cultivating and harvesting of groundnuts.	(1) 5 years(2) 3 years. Tindivanam, Coimbatore.
		Madhya Pradesh	
3	Scheme for the agronomic investigations on groundnut at Amravati in Madhya Pradesh.	The object of the scheme is to conduct agronomic experiments on groundnut with a view to find out the optimum seed rate, optimum spacing economic dose of fertilizers and their suitable combination with organic and inorganic manures.	3 years.
		4. PESTS AND DISEASES SCHEMES	
		Bombay	
1	Scheme for investigating the life history and control measures for sesamum gallfly in Bombay State.	The object of the scheme is to evolve suitable cultural or insecticidal measures for the control of sesamum gallfly.	3 years.
2	Scheme for investigating into the leaf spot disease (tikka) and sclerotium disease of groundnut in Bombay State.	The object of the scheme is to evolve suitable measures for the control of leaf spot and sclerotium disease of groundnut.	5 years.
		Delhi	
3	Linseed Rust scheme at the I.A.R.I.	Studies are proposed to be carried out in rust of linseed and analysis of rust collection from different parts of the country.	5 years 6 months

S. No.	Name of the scheme	Object of the scheme	Period and Venue
4	Scheme for research on phyllody disease of sesamum at I.A.R.I., New Delhi.	The following items of work are contemplated:— (i) To confirm if the disease is of virus nature. (ii) To determine the mode of transmission of the disease. (iii) Study of the properties and host range of the disease. (iv) Testing of the varieties evolved at the Institute for their resistance to phyllody.	3 years I. A. R. I., Extended further for 3 years.
5	Scheme for testing disease resistance in linseed varieties for Malwa at the I.P.I. Indore.	The object of the scheme is to test the varieties of linseed evolved in Uttar Pradesh and Madhya Pradesh for disease resistance.	5 years Indore.
		West Bengal	
6	Oilseeds pests scheme in West Bengal.	The object of the scheme is to study (a) the life history, seasonal incidence, host plants and insecticidal control of mustard aphis, which is considered to be the most serious pest in West Bengal and (b) to carry out detailed survey in respect of important pests affecting oilseeds grown in West Bengal.	3 years Berhampore.
	(5) ARBORETUM OF OIL-BEARING TREES & PLANTS		
		Bombay	
1	Scheme for the establishment of regional arborata of oil-bearing trees.	The object of the scheme is to establish arboretum of oil-bearing plants in different parts of Bombay with a view to studying their various phases of development and their commercial utilisation.	5 years Poona.
		Hyderabad	
2	Scheme for the establishment of regional arboretum of oil-bearing trees.	The object of the scheme is to establish arboretum of oil-bearing plants with a view to studying their various phases of development and their commercial utilisation.	5 years Himayatsagar farm.
		Madras	
3	Scheme for the establishment of regional arboretum of oil-bearing trees.	The object of the scheme is to establish arboretum of oil-bearing plants with a view to studying their various phases of development and their commercial utilisation.	5 years Tindivanam.
		Uttar Pradesh	
4	Scheme for the establishment of Regional arboretum of oil-bearing trees.	The object of the scheme is to establish arboretum of oil-bearing plants with a view to studying their various phases of development and their commercial utilisation.	5 years Kanpur.

REGIONAL RESEARCH STATIONS FOR OILSEEDS IN INDIA

The Committee at its October, 1955 meeting decided that future research on oilseed crops in India should be established in a properly co-ordinated manner on the basis of soil climate—variety complex through the establishment of Regional Research Stations. An expert sub-committee was appointed to examine the question, suggest finance, facilities etc., required and how the existing schemes could be fitted into the new pattern. Considering the report of the expert sub-committee, the full Committee decided in March. 1956 to establish the following centres:—

Main Stations

(1) Coimbatore:—Groundnut as main crop and sesamum as subsidiary crop.

(2) Hyderabad:—Castor as main crop and sesamum and groundnut as subsidiary crops.

(3) Kanpur :—Brassica Juncea (rai) and Brassica Campestris (sarson) as main crops and Sesamum as subsidiary crop.

(4) Ludhiana :—Toria, taramira and sarson as main crops.

(5) Indian Agricultural Research Institute, New Delhi:—Linseed as main crop in addition to cytogenetic work on Brassica, Linseed and Sesamum and rust research work on Linseed.

Out Stations

(1) Akola:—for groundnut as main crop and Linseed as Subsidiary crop.

(2) Hoshangabad :—for Linseed.

(3) Junagadh :—for Groundnut.

(4) Honnali or Chennagiri in Mysore for Groundnut and Sesamum.

(5) Calcutta in West Bengal (Jute Agricultural Research Institute):—for Brassica.

(20) REVIEW NOTE ON ANIMAL NUTRITION

BY

DR. N. D. KEHAR

I. *Problems on which research work has been completed and the results obtained therefrom can now be passed on to extension workers for general adoption*

1. *Use of mineral mixture for optimum growth rate of calves and milk production in cattle and buffaloes*

A growing calf requires daily about 15 gm. of calcium and 12 gm. of phosphrous for vigorous growth. A lactating animal requires in addition of the daily maintenance requirement of 10 gm. each of calcium and phosphorous, 1 gm. of calcium and 0·75 g.m. for each pound of milk secreted. These quantities of minerals may not be usually present in the ration of calves and high milk yielding cows, particularly if their ration does not contain sufficient leguminous feeds. Moreover, it has been found that the requirement of calcium is approximately doubled, when paddy straw forms the basal roughage. Under such conditions it is essential that the ration should be supplemented with a mineral mixture so as to ensure proper growth and milk yield.

Besides calcium and phosphorus, certain other minerals like copper, cobalt, manganese and iodine have also to be supplied in optimum quantities so that the health and productive capacity of the animals are not affected. Certain areas in India and certain types of ration have been shown to be deficient in one or more of these trace elements. In order to safeguard against these deficiencies particularly where mortality in calves or unthriftness or low yield in cattle have been observed, supplementation of the ration is necessary.

A complete mineral mixture for feeding the livestock has been devised after years of experimentation on which field trials have given encouraging results. It is recommended that 1 oz. of this mixture may be fed daily to growing calves. Cows giving over 5 lb. milk are to be given 2 oz. per day. If the milk yield is over 10 lb. 1 oz. more of this mixture is to be given for every extra 5 lb. milk.

2. *Preventive measures to be undertaken in fluorisis areas* :

In certain areas in India, the element fluorine is found to occur in abnormally high quantities in water and soil. Animals reared in those areas, particularly when kept on a low phosphorus ration, are found to suffer from anaemia, stiffness of gait, exostoses of ribs and long bones, debility and unthriftness. Preventive measures to prolong the life and usefulness of animals in such areas are given below:—

(a) Administration of 2 oz. of bone meal or a complete mineral mixture, so as to ensure adequate calcium and phosphorus ingestion.

(b) Administration of 1 oz. of aluminium sulphate per animal per day. This supplement is extra to that given in (a).

(c) Water from wells generally have higher fluorine concentration than that from ponds or flowing streams. Treatment of well water with slaked lime has been found to reduce the fluorine content below toxic level.

3. *Utilisation and exploitation of subsidiary feeds and by-products of industries.*

The acute shortage of livestock feeds in India is perhaps the greatest single factor responsible for the degeneracy of our livestock. The urgent need for the provision of more feeds for the livestock cannot be overemphasised and investigations have been in progress at the Animal Nutrition Division, Indian Veterinary Research Institute since 1940, to discover new feeds for animals from untapped sources.

As a result of these investigations a number of substances, hitherto, going waste have been discovered which can be usefully used for feeding to livestock either as such or after simple processing.

Mango seed kernel, jaman seed, tamarind seed, cassia tora seed, rain tree fruit, fish meal, entrials, from slaughter houses etc., can be used to replace a part of the protein rich feeds like grains etc.

Wild grasses like kans, munj, kantiara, etc., have been found suitable as roughages.

If all these foodstuffs can be properly mobilised considerable increase in the available feeding stuff can be secured.

4. *Feeding greens essential for ensuring more milk of better nutritional value.*

Green succeulent feeds occupy a special position of importance in the ration of livestock. Young growing plants have been found to contain fairly large quantities of proteins of high biological value. Legumes contain in addition substantial quantities of calcium. All green feeds contain large amount of carotene, the precursor, from which vitamin A is produced in the animals.

A Basal ration consisting of straws or other dry roughages together with concentrates like oilcakes, bran etc., may not contain sufficient calcium for optimum milk production. Such a ration is definitely deficient in vitamin A potency and if continued for a long period may produce deficiency symptoms like night blindness, blingness and weakness in new born calves and liability to infection etc. Moreover, it has been found that the concentration of vitamin A of milk is proportional to the quantity of carotene ingested by the animal. Inorder to safeguard against calcium and vitamin A deficiency and to ensure the production of milk having a fair vitamin A content, it is necessary that a daily supplement of at least 5 lb. of green feeds, particularly legumes, should be introduced in the ration of milch animals.

Besides the above properties, introduction of green feed enhances the palatability of the coarser ingredients of the ration. Certain green feeds also contain cestrogenic substances which are necessary for ensuring that the cattle come to heat regularly.

5. *Feeding of animals on balanced rations in village.*

The productivity of the Indian cattle is perhaps the lowest in the world. Faulty nutrition is one of the major causes for this degeneration. Repeated experiments have shown that when proper attention is given to supply adequate quantity of balanced feed to animals in India, their productivity is increased immediately. Thus through feeding of balanced ration the milk yield has been observed to increase by 50 to 90 per cent and egg yield by about 100 per cent. At Izatnagar an increase of 50 to 70 per cent in the weight of sheep has also been recorded through balanced feeding.

If the advantages of balanced feeding of livestock are brought home to the villagers, and they take to it, the productive capacity of the livestock will be effectively enhanced.

6. *Crop and legume rotation in cultivation practices.*

The utility of grass-grain rotation in improving the yield of grain has been stressed quite a lot but not much attention has been given in this country to this aspect of farming in improving animal nutrition. Observation carried out at the Indian Agricultural Research Institute and elsewhere have shown that the yield of wheat grown in plots in which berseem had been raised after application of superphosphate was more than 100 per cent higher than wheat followed unmanured berseem. Moreover, it was found that even without the addition of any further manure, the yield of wheat in the next two years from the plots which had received superphosphate remained 100 per cent over that form unmanured plots showing that the built up fertility in the former plot was by no means exhausted. Thus, if a farmer uses rotational cropping practice, utilising 1/3 of his land for berseem growth, then, not only will he be getting more grain out of the rest 2/3 part of his land but also substantial quantities of a fodder of high nutritive value for feeding to his livestock. He will also be requiring only 1/3 of the superphosphate which he would have required if berseem was not used. Moreover, there will be substantial reduction in the quantities of nitrogenous manures to be used.

It will be a good practice also to utilise all current fallows for growing legumes as this will not only provide urgently needed animal feeds but will also enrich the land for subsequent crops.

7. *Popularisation of growing fodders, silage making and improving methods of hay making.*

Our animals subsist ordinarily on the byproducts of crop processings. *viz.*, straws, oilcake bran, husk, chuni etc. These are neither good pastures nor is green fodder produced in any significant quantity. With the increase in human population there is a tendency to bring under plough more land either for growing human food or cash crops. This results in further aggravating the already existing acute shortage of livestock feeds in India.

It is, therefore, necessary that the urgency for putting a portion of land under fodder cultivation be impressed upon the farmers.

The usefulness of conserving, as silage as much of green feeds as possible be popularised. The Animal Nutrition Division, Indian Veterinary Research Institute, has after long experimentation found out convenient methods for ensilage, particularly suitable for single families in villages. It has been shown that good quality silage, can be prepared in an easy manner and a small silopit of 8′×5′×4′ can be used to ensile 125 mds. of green fodder. In very wet areas the tripod method of making hay should be given a fair trial.

II. *Problems on which further research is required & should be intensified*

1. *Economic rearing of calves.*

In order that calves may grow well and become productive at a comparatively early age, it is essential that they should be reared on balanced rations containing all essential nutrients in optimum quantities for growth and maturity. A calf on all ill-balanced ration grows poorly and further its future productive ability may be irreparably damaged. As, however, a calf seldom becomes productive before 3-4 years of age, a false economy is often effected in cutting down its ration with subsequent disasterous results. This is more the case with suckling calves which are often given only one teat of the dam to suckle. As the average milk production of ordinary cow is often poor, this method provides the growing calf with insufficient protein, energy and minerals.

In order to supplement the ration of calves, it is essential that intensive work should be carried out to formulate economic calf meals which may be used to supplement the feeding of calves.

2. *Nutritional requirements of different animals.*

A study of the nutritional requirements of different species under different physiological conditions as a mean for effecting economy, while ensuring optimum production, cannot be overemphasised. Researches in the Animal Nutrition Division laboratories have shown that Indian Cattle need about 25 per cent less protein and energy than that advocated by foreign workers.

Feeding of a mixture of trace elements, devised on the basis of studies on the nutritional requirement of cattle for these elements, have been observed to increase the growth of calves, enhance milk production and decrease the dry period.

Although a good deal of work in this line has already been accomplished much still remains to be done.

3. *Survey of the resources of animal feeds.*

The necessity of assessing animal feeds resources was recognised a few years ago. Such token surveys are being initiated out on regional basis and information of great interest is being collected Observations so far indicate that the chemical make-up of different feeds is considerably affected by climate-*cum*-soil complex. These surveys should be carried out on an intensive basis for finding out (1) the availability of feeds in different seasons and (ii) their chemical make-up and the nutritive value. The information so collected will also indicate the gap between the available and required feeds

4. *Location of the extent of specific dietary deficiency diseases.*

Sporadic cases of mineral and vitamin deficiences diseases have been reported from different parts of the country. Except for a few cases, frank dietary defficiencies are not ordinarily met with under field conditions. Sub-adequate plan of feeding, however, produces sub-clinical manifestation of dietary deficiencies, such as, slow growth, shy breeding, low milk production and susceptibility to certain infection. An intensive programme of survey of such diseases is considered essential. This will not only save valuable lives but will augment animal products, like milk, meat, wool and egg.

III. *New problems on which research should be initiated*

1. *Ingestion of nutrients by animals from stray grazing.*

Considerable amount of work has been carried out on the nutritive value of indigenous and exotic grasses. No work has yet been undertaken to find out the nutrients ingested by animals during stray grazing. It will be desirable to conduct experiments on the ingestion of nutrients by different species of animals under different conditions of grazing. The effect of manures, irrigation etc., in grasing areas should also be investigated.

2. *Study of mineral metabolism with radio-active isotopes.*

The importance of minerals in animal nutrition has been well recognised. The production of radio active minerals *viz.*, phosphorous calcium, iodine, cobalt has, however, provided a new experinmental approach to the metabolism of these elements in the animal body. By labelling some atoms it is possible to follow the distribution of these atoms in the body tissues, urine and faces etc., of the experimental animals. These methods are less time consuming and more effective.

3. *Carrying capacity of land under irrigated condition.*

The scarcity of land for producing cattle feed is one of the chief obstacles in the provision of cheap feeds for animals in India. Very little work has been done in India in the improvement of grasslands to be used as pastures In England and Australia, more attention is now given to grazing as this provides the cheapest method in the maintenance of livestock. Work carried out at the I.V.R.I. has shown that the yield of grasses can be augmented by Irrigation. Work should be taken up to rehabilitate worn out grazing lands by introducing better species of fodder and by manures and irrigation. It is expected that through such methods as well as through rotational grazing practices the carrying capacity of the available land will be greatly increased.

4. *Efficient utilisation of protein rich fodders* :

5. *Feeding of animals in arid areas.*

The problem of feeding animals in dry areas is beset with large number of difficulties. Besides the fact that such areas are exposed to the ravages of drought, regular supply of the desirable type of nutrients is not possible. It will be desirable to find out the type of feeds available in such areas and to undertake a programme of augmenting feeds by planting trees, shrubs and grasses suitable for such climatic conditions. A Saccaharum munj would be of particular value in reducing anti-erosion by wind and also for providing a fairly good roughage during dry periods.

(21) REVIEW NOTE ON THE PROBLEMS OF RESEARCH ON COTTON

BY

B. L. SETHI

The aim of the Indian Central Cotton Committee has always been to supplement the work of the Agricultural Departments in the cotton growing States. The funds at the disposal of the Committee are usually allotted for research into cotton problems, agricultural and technological, mainly of all-India importance and for the development, extension and marketing of the improved varieties of cotton in the various tracts.

The Committee has so far financed 129 research schemes and 76 multiplication and distribution schemes at a total cost of 1.84 crores of rupees.

While the majority of the schemes deal with the improvement of the race of the plant, the Committee has also financed research schemes for the control of insect pests and diseases and for the study of the agronomic and physiological problems. The progress of cotton research in the country is dealt with below :—

(1) *Problem on which research work has been completed and the results obtained therefrom can be passed on to the extension workers for general adoption.*

(a) *Crop Improvement.*

The breeding work carried out under the Committee's schemes in the different States has yielded the following improved varieties of cotton which have been released for cultivation in the respective cotton tracts for which they have been bred :—

LIST OF IMPROVED VARIETIES.

State	Name of the type		Year of release	Area covered by the type	Potential area likely to be covered	Remarks
	American	Desi		1955-1956 (Thousand acres)		
1	2	3	4	5	6	7
PUNJAB	216F 320F		1948 1951	982	1,189	These are under general cultivation.
	H. 14		1954			This is replacing 216 F
	*LL.*53 *LL.*54 *LL.*56 *J.*34					Being tested in the districts.
		231 R	1953			
BOMBAY .				7,842	7,434	
North Gujerat		*Wagotar*				This has been replaced by Kalyan.
		Kalyan	1947			
Middle Gujerat		Vijay	1943			Vijay being replaced by Digvijay.
		Digvijay	1955			
South Gujerat		Suyog				Has been replaced by Vijalpa.
		Vijalpa	1953			
Khandesh		Jarila	1942			This has been completely replaced by Virnar.
		Virnar	1949			
		Y 1	Not released			This is being tested in the districts.

1	2	3	4	5	6	7
Amrali (Former Saurastra)		*Pratap*	1947			
		J.73	1956			Being intensively tested.
Surat	Interspecific					
	170-*Co.2*					Spread in Sabarkantha and Kaira district.
	134-*Co.2-M*					
	Parbhani American		1950			Occupying the entire protected area.
		Gaorani-6	1937			
		Gaorani-12	1946			
		2204(Daulat)	1954			
MADHYA PRADESH		*Indore-1*	1945	953	5,571	This is spreading in Rajasthan in Udaipur Tract.
		Indore-2	1950			Had not made much headway.
		Malvi 9	1934			Has completely replaced the original bulk Malvi.
		Bhoj	1943			Being cultivated in wilt infected areas being resistant to the disease.
		197-3	1953			This has been recommended for cultivation in the desi area of Nimar Tract.
		D.48-154 (Maljari)				
	Buri 107		1952			Replaced by Buri 0394.
	Buri 0394					
		Verum 262				These have been completely replaced.
		Verum 434				
		H.420	1949			
		Selection 91	1950			
		M. 5A (Malini)	1954			
		Jarila				
		197-3				
MYSORE (including Parts of Hyderabad and former Madras).	M.A.2		1948	2218	1636	Has been replaced by M.A.5
	M.A.5					Resistant to Jassid. Being tested in the cultivators fields.
	1821-1-1					Resistant to Blackarm.
	2196-4					

1	2	3	4	5	6	7
		Selection 69	1942		1636	Has been replaced by Laxmi.
		*Westerns-*1	1925			This has replaced Gadag 1.
		Raichur-Kumpta				
	Laxmi		1948			This is now under general cultivation having replaced Jayawant the former strain.
		Jayadhar	1950			
MADRAS	Co.2			697	872	
	*M.C.U.*1					
	*M.C.U.*2		1955			
		216F				Cultivated in the rice fallows.
		Karunganni 2	1947			
		Karunaganni 5	1945			Being tested in the district.
		6186-9	Not released			
ANDHRA		*N.* 14	1927	590	711	Has been replaced by Cocanadas 2.
		Cocanadas 1				
		Cocanadas 2	1950			
		881F				
UTTAR PRADESH.		C. 520		99	146	
		35/1	1940			

The above list of varieties in each State represents the evolution of improved strains and the latest strains either about to be released or have been already released or under district trials have been underlined.

The results of the crop improvement work financed by the Committee are carried to the door of the cultivators through the agency of the various seed multiplication, distribution and extension schemes that function in the different States. This work has been greatly intensified in recent years and has also been augmented by the Cotton Extension Schemes financed directly by the Government of India. As a result of the combined efforts under the Committee's and the Government of India's schemes, area under the improved varieties in 1955-56 was of the order of 13·6 million acres constituting about 68% of the total estimated area of 20 million acres under cotton.

(b) *Cotton Agronomical and Physiological work.*

Physiological work on the periodic partial failure of American cotton on account of *triak* (bad opening of bolls) had been undertaken in the undivided Punjab and completed : *triak* was found to be associated with two sets of soil conditions : (1) soils which contain alkali salts in the sub-soil from the second or third foot onwards, (2) soils with extreme nitrogen deficiency. Those soil conditions may exist separately or together.

The application of nitrogen in the form of sulphate of ammonia to light sandy soils deficient in this element has proved very beneficial in reducing bad opening of bolls and increasing crop yields. But this method has been found ineffective on sandy loams with saline sub-soil. In the latter case *Triak* can be controlled effectively by sowing the crop in June and by applying heavy irrigations at short intervals beginning with mid-August. Late sowing, however, adversely affects the yield but this disadvantage can be remedied by thicker sowing of the crop.

With a view to investigate the applicability of the results obtained in the Punjab to other areas, the Committee undertook new scheme for cotton physiological research at Indore. This scheme had for its object the study of the inter-relationship between the soil and climatic factors and the growth of different varieties of cotton and to endeavour to utilise the knowledge gained for improving the quality and yield of cotton in general. The experiments were carried out in cooperation with the State Departments of Agriculture in the Punjab, Bombay, Mysore, Mewar and Indore. Further investigation as to the causes for low yields of American and Egyptian cottons in the former Bombay-Karnatak and Mysore States have also been undertaken at Dharwar and Mysore. It was found that early sowing by the end of July instead of third week of August in Dharwar and application of potash or phosphorous or both in conjunction with Ammonium Sulphate in Mysore would be conducive ton enhancing the yielding capacity of the American Cotton in Karnatak and Egyptian cotton in Mysore. Further research for the confirmation of the preliminary results already obtained is now under way.

Agronomical work in connection with the improvement of cotton yields in former Pepsu (now Punjab) and Punjab is still under way. The object of the Punjab and Pepsu schemes is to obtain information on the exact manurial requirements of American cotton in relation to other controlling factors, *viz.*, sowing date, spacing, rotations and irrigations, in the different ecological regions of the cotton growing tracts.

The scheme for the study of agronomy of cotton at the Institute of Agriculture, Anand has since terminated. The object of the scheme was to study the requirements of long staple American varieties under conditions of North Gujerat in respect of (1) the time of planting, (2) Spacing, (3) manuring and (4) irrigation to obtain maximum production of the desired quality. The results of the scheme at Anand indicated that pre-monsoon sowing, *i.e.*, during the second week of June, coupled with the application of 75 pounds of nitrogen and spacing of 5′×2′, were found to be the optimum agronomic practices that would result in maximum yields in this tract.

Investigations were also carried out with the aid of the funds provided by the Committee into the causes of harmful effects of cholam (Jowar) as compared with those of combu (Bajra) on the succeeding crop of cotton in the black soils of Tinnevelly district. These studies have indicated that thick sowing of cotton and late ploughing of cholam soil coupled with an application of correctives *gypsum* and *molasses* reduce greatly the harmful effects of jowar crop on cotton.

(c) *Diseases and Pests*

(i) *Diseases.*—Investigations on the cotton wilt indicated that the most successful method of controlling the disease is by the development of resistant strains under optimum conditions for the development of the disease. This work has been in progress at Poona and resistant strains suitable for Middle Gujerat, South Gujerat, Khandesh, Bombay-Karnatak and Hyderabad have been successfully evolved. These are Vijay and Digvijay for Middle Gujerat, Suyog and Vijalpa for South Gujerat, Jarilla and Virnar for Khandesh. Jayawant and Jayadhar for Bombay-Karnatak and G.6-E-3 and Daulat for Hyderabad.

Investigations on root-rot in the Punjab had indicated that incidence of disease was low in the crop sown in the first week of April and after the middle of June and that inter-cropping of cotton with sorghum (jowar) and moth (phaseolus aconitifolius) reduced plant mortality appreciably. This practice has been widely advocated in the Punjab and Uttar Pradesh for adoption by the cultivators.

Pests.—The study of pink and spotted bollworm was undertaken in the States of Uttar Pradesh, Punjab, Bombay (old). Madhya Pradesh (old) and Hyderabad (old). In so far as the pink bollworm is concerned, it was found that heat treatment of cotton seed by exposing them in the sunshine when the temperatures go up in the summer to about 110 to 115°F, would minimise the pest incidence. The best method of controlling spotted bollworm was found to be by the removal of alternate host plants and pulling out of cotton stalks instead of cutting them at ground level. This is widely practised now in Gujerat.

As regards Jassids, it has been found that the best way of controlling them is to breed for jassid resistance. M.A. 5 in Mysore. M.C.U. 1 and M.C.U. 2 in Madras, 216F and 32 F in Punjab and Buri 0394 in Madhya Pradesh have been bred for Jassid resistance.

Steam-weevil.—Breeding for resistance to steam-weevil was undertaken in Madras. Resistant strains so developed were further utilised in the evolution of economic strains.

2. *Problems on which further research is required and should be intensified.*

(a) Intensive work on the breeding of long staple cotton of 1.1/16″ and above is the urgent need under the improvement of Indian cottons, particularly to bridge the gap between the indigenous production and the mill requirements of such long staple cottons.

(b) Further research is required to be carried out in the utilisation of the wild species of *Gossypium* for evolving suitable types through cross breeding.

(c) Intensification of cotton technological research with a view to helping the cotton breeders in their work of selection.

(d) Agronomical research for the improvement of cotton yields in rainfed and irrigated areas on an all-India basis.

(e) Physiological work in connection with the potash and phosphate requirements for enhancing the cotton yields of *hirsutum* and *barbadense types.*

(f) Intensification of work on the hybrid cotton between the *hirsutum* and *barbadense* as also between the in indigenous species.

(g) Concerted work on the cultivation of Sea Island and Egyptian varieties.

(h) Breeding for *black-arm* resistance.

(i) Intensive investigations on preventive and direct control measures against bollworms, jassids and other insect pests.

(j) Intensive study of the application of hormones on the yield of cotton, both *desi* and American.

(k) Manurial schedules for different varieties grown under different soil, climatic and agronomic conditions to provide precise information on manuring and use of fertilizers.

(1) Cost of production of cotton and its rotational crops in States other than M.P. where the work has already been completed.

(m) Future investigations into determining suitable crop estimating techniques is that the existing discrepancies between the trade and official estimates be minimised.

3. *New problems on which research work should be initiated*

(i) Investigations on the possibilities of growing harsh short staple cottons in different cotton growing States in isolated patches.

(ii) The possibility of growing Sea-Island cotton in Assam.

(iii) Breeding for oil-content of cotton seed.

(iv) Breeding for freedom of neps.

(v) Breeding for long staple cottons for cultivation in the new irrigation-*cum*-hydro-electric projects.

(vi) Breeding for extra long staple cotton of 1.3/16″ staple and above.

(vii) Maintenance of genetic stocks of the more plastic Varieties existing in far flung pockets of India.

(viii) Work on the water requirments of cotton in the different states for different varieties and soil types.

(ix) Pilot Schemes for crop yield estimation which should aim at determining representative and objective data on the cultivation practices associated with the growing of cotton crop in different states of soil types.

(x) Research on the possibility of reducing cost of cultivation of cotton by adopting suitable implements.

(22) REVIEW NOTE ON SUGARCANE RESEARCH IN INDIA
BY

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(1) *Problems on which research work has been completed and the results obtained therefrom can be passed on to the extension workers for general adoption.*

The different specialised aspects of the sugarcane crop have received considerable attention. The salient results obtained thereunder are given below :—

Breeding and Botany.—The fountain-head of sugarcane varieties at Coimbatore has maintained almost a constant stream of new releases, its breeding programme being geared to the needs of the industry. This latter has aimed at producing varieties combining high tonnage and juice quality tolerance to adverse conditions of growth and resistance to pests and diseases. Anatomical work in relation to the sugarcane stalk has enabled correlation of various attributes of a cane variety such as field resistance to insect pests, rodents and jackals and milling behaviour in the factory with its important anatomical characters. The development of pith and cavity, largely a varietal feature, is also found to be affected by several external factors. Studies on the association of plant characters with resistance to insect pests have lead to the formulation of distinct morpho-anatomical criteria for resistance or susceptibility to a number of pests.

Cane Agronomy

Varietal.—Such veteran canes as Pundia and vellai have been completely replaced by Co. 419 which, has truly come to be recognised as the Wonder cane of South with acre-yield and quality respectively ranging between 40-90 tons and 13-16% sugar in cane. Co. 419 is a variety par excellence in the entire peninsular India and is now on its march to the North covering as it does a considerable part of the cane acreage in Orissa, West Bengal and Assam, as also certain tracts in the State of Bihar. In the Sub-tropical belt of North India, Co. 312 and Co. 421 have proved very successful, the new variety Co. 453 having been an outstandingly high yielder and Co. 527 an early high sugar variety. Further, local selections from fluff received from Coimbatore such as Co. L.G., Co. S. 10, Co. S. 245, Co. S. 321 and Co. S. 416 are showing up well, the first named in the Punjab and the rest in U.P. In the State of Bihar, the local releases B.O. 10 and B. O. 11 out of the varieties bred there have made their mark and cover extensive acreages in the sugar tract. The former of the two have shown exceptional field resistance to Red-rot disease, the last named having established a record for sugar per acre in the Sub-tropical North.

Manurial.—Manurial doses vary largely in different parts of the country, a heavy nitrogenous dressing (300-450 lbs. N. per acre being applied in Bombay followed by 200-350 lbs. per acre in Madras). Both the States come under the tropical region and produce high tonnage of the crop. In the Sub-tropical North, Nitrogen doses generally range between 120 and 200 lbs. under irrigated conditions and barely 100 lbs./acre under unirrigated conditions. The manurial map of India has till recently consisted of Nitrogen alone, phosphatic applications being restricted to Bihar and parts of Madras and Bombay.

Cultural.—The most important cultural improvement has been a shift in the planting date so as to increase the growthspan of the crop and thus step up its tonnage and quality. Peninsular India has largely switched over to an *Adsali* (18 months) crop from the older practice of *Eksali* (12 months) plantings. Similarly in North India, a rapid change over to autumn planting is taking place. The benefits consist in a much higher tonnage with substantial improvements in quality. Means have also been devised for raising production by other cultural means such as by reducing the distances between and within the rows of crop and by adoption of a new procedure of stubble harvesting consisting in digging the cane instead of cutting it at the surface. Weed control by 2, 4-D and MCP has likewise been successfully effected.

Irrigational.—Work on irrigational requirements of sugarcane under controlled conditions has been done at the sugarcane research stations in U.P., Punjab and Bombay. In U.P., 5-6 irrigation in Western, 4-5 in Central and 3-5 in Eastern Uttar Pradesh were found to be the normal requirements of the crop during pre-monsoon period, each irrigation being of 80,000 gallons of water per acre. In Punjab 70-75 acre inches of water were found to be optimum. In Bombay 95 acre inches were found to be optimum requirements of water in combination with 150 lbs. nitrogen.

Gur Chemistry

The hand refractometer has been used in the Indian industry with fruitful results. Among its important applications may be mentioned the evaluation of juice quality in standing cane by refractometer survey for which dependable procedure has been developed. This has enabled pre-determination of crushing schedule in succession of ripening, leading to substantial enhancement in sugar recovery.

Gur Chemistry

The nature of *gur* and its formation have been elucidated in the light of physico-chemical theories. A considerable amount of work has been done with regard to the effect of juice composition on quality of the product, the adverse role of various non-sugar constituents, both organic and inorganic, being brought out in this section. Manurial and cultural treatments have been shown to influence the non-sugar status, suggesting a means for improving the quality of *gur* from varieties inherently poor in this regard. The problem of juice clarification in *gur* manufacture has also been studied, notable advances being (i) the use of activated paddy husk carbon and (ii) the evolution of a cheap and effective methods of clarification with the extract of castor seeds or groundnut or of a ready made tablet made from scyabean flour with traces of mono-calcium phosphate. Work on *gur* storage has resulted in the evolution of several methods suiting conditions in villages, large markets and in transport, which protect the stored product from liquefaction and deterioration during the rainy season. Studies on the nutritive value of *gur* have indicated its superiority over sugar from this point of view. Work on cane crushers and juice boiling furnaces for the *gur* industry has produced a number of improvements with regard to both.

Soil Survey

Studies of soil characteristics have constituted a major item of sugarcane research in the States of Bombay, Uttar Pradesh and Bihar. The Bombay work began with a classification of the black cotton soils of the major canal tracts into twelve distinct types on the basis of topography, drainage and sub-soil water table and this has been followed by a rapid test survey of the soil types and preparation of maps showing physical properties and nutrient status. In Uttar Pradesh, classification of the sugarcane soils into three major types has been effected along with further sub-division into lower category level of texture and phase. In both States, extensive crop cutting and manurial experiments have been carried out on different soils for assessing their manurial requirements. In Bihar five broad soil divisions have been recognised in the sugarcane growing areas based on variations of climate.

Sugarcane Entomology

Although the colossal losses brought by the insect pests of sugarcane have been realised for the last twenty years or so, the systematic position of some of them was not clear until recently. The morphology and biology of the various important pests have been worked out in detail in case of termites. The influence of climatic conditions on the pests population has been exhaustively studied and sampling technique evolved for estimating the incidence of borers, pyrilla, white fly and mites In the field of borer control, mechanical measures such as collection of egg masses and adults, cutting out dead hearts, killing of live larvae by spindle thrust and early earthing are successful as also biological control by trichogramme under limited conditions. The discovery of new insecticides has, however, for the time being at least relegated these methods into the back ground for the results of chemical control have been quite spectacular in the case of both white-fly and pyrilla where D.D.T., B.H.C. and Endrin have proved admirably successful and less so in the case of borers where Endrin is showing some promise. Similarly control of termites can be effectively secured by treatment of setts lying in furrows with Aldrin and Dieldrin, the protection afforded lasting over one year. Besides the above, a number of minor pests such as grass hoppers, 'hispa', black bugs, army works, thrips, aphids and mites prove amenable to chemical control with one or the other of various insecticides such as D.D.T., B.H.C., Aldrin and Dieldrin.

Sugarcane Mycology

Red-rot.—Red-rot is the principal disease of sugarcane in subtropical India, its causal agent. Two epiphytotics in the recent past have been associated with the appearance of a distinct strain. A certain amount of information has become available with regard to the growth and longevity of the pathogen; the physiology of the fungus has not received adequate attention so far.

Wilt.—Wilt of sugarcane is a disease often occurring in association with red-rot and under these conditions it causes much greater damage to the crop than either of the disease occurring alone. It has been possible to produce typical symptoms of wilt by soil inoculation in the vicinity of artificial injured roots and by growing healthy plants in infected soil.

Smut.—Smut disease is also important which has more than once necessitated large scale control measures consisting in eradication of diseased clumps and replacement of the susceptible variety.

(2) *Problems on which further research is required and should be intensified.*

(i) Since variety is the pivot around which the sugarcane and sugar industries revolve, it is of utmost importance that special attention is paid to evolve improved prolific varieties possessing high degree of disease, pest and frost resistance and suitable to the different soil and climatic conditions prevailing in the various regions of the country.

(ii) In view of the increasing application of different nitrogenous fertilisers to the agricultural crop in the country and in particular to the sugarcane crop, it is felt desirable that the phosphatic fertilisers may also be employed in order to maintain a correct balance in the soil and further to improve the juice quality in cane apart from increasing its yields. Although in Southern India the application of super phosphate applied @ 200-250 lbs. p275 per acre depending upon the local soil and climatic conditions has proved profitable, the general application of this fertiliser in Northern India, barring certain localities, has not so far brought any appreciable improvement in sugarcane yield or quality It is, therefore, essential that further research work is conducted on this problem.

(iii) Since sugarcane is a heavy feeder crop and requires large quantities of irrigation water, it is most essential that irrigation water is supplied to the sugarcane growers regularly and in accordance with their requirements, which is at present not the case in most of the areas. If possible, further research may be made to obtain optimum quantity of sugarcane per acre and of requisite quality with the amount of irrigation water generally available.

(3) *New problems on which research work should be initiated.*

(i) *Cane Agronomy.*—Studies of new varieties bred mainly at Coimbatore through coordinated varietal trials including mill tests, or tests for suitability for *gur* manufacture with a view to selecting and multiplying cane varieties with high acre-yelds, high sugar contents and high resistance to pests and diseases under different climatic and soil conditions.

The work on hybridisation, selection, description and classification of different promising cane varieties and their suitability in different tracts is proposed in some States like Mysore and Assam.

Studies on Economics, resistance to water-logging, drought resistance, arrowing habit, seed setting and physiology will be carried out in the important States. In Bombay it is proposed to undertake Cane bionomics in relation to various nutritional and cultural experiments under different climatic and soil conditions with the special object of inducing greater tillering and minimising tiller mortality during hot weather. In Punjab, different studies on physico-chemical attributes of the soil on permanent experimental plots and role of micro-nutrients in plant growth will be dealt with. In addition to the above investigations, the possibilities of improving germination by pretreatment of setts, intensifying tillering during hot and early monsoon period and the inter-relationship between varieties, soil, seasonal changes and manuring will be carried out. The intensive study of plant tissues and their role in sugar storage will be studied in Bihar.

Slight variations in the programme of work such as studies on inter-relation between organic and inorganic manures, tonnage, juice quality of cane, effect of irrigation intervals, and different nitrogenous phosphatic and potassic fertilisers on different types of soils use of factory waste products or press mud etc. has been proposed for the different Regional Stations. Investigations with regard to the optimum culture of cane, *i.e.*, ridging time, rotation, spacing, etc., and inter-action with manuring and irrigation to ensure maximum limit of yield without imparing quality of cane and soil fertility by careful experimentation are proposed to be taken up at most of the sugarcane Research Centres. The chemical weed control experiments would also be taken up at Central Research Stations so as to eliminate competition with the crop for nutrients and moisture.

It is of utmost importance to conduct extensive manurial experiments on cultivators fields under varied types of soil and climate so as to determine the optimum schedules appropriate to each type. A judicious combination of organic manures and inorganic fertilisers would be necessary to arrive at this combination in relation to the soil unit by actual experimentation.

(ii) *Soils.*—Although a large mass of data already exists on the various aspects of sugarcane soils in the different cane growing States in India, not much use could possibly be made of the available information due to the work having been carried out by following different methods in the different States and mostly in an unrelated manner. In future, therefore, it would be desirable to follow uniform pattern of soil survey and soil analysis, as far as possible under local conditions. Furthermore, the observations made in the field in respect of the formation of soil profile in any one tract and the laboratory data regarding such soils, have to be checked up under field conditions by laying out manurial and manurial-*cum*-irrigational trials in large numbers in the different soil-climate belts recognised in the country. The effect of the nature of soils on the yield and quality of sugarcane has also similarly to be evaluated.

For the immediate purpose of demarcation of types for determining the suitability of soils for sugarcane a basic land classification rather than soil classification appears to be necessary. The need of intensifying research on the utility of the phosphatic fertilisers is also important. The function of phosphorus in enhancing the nitrogen content of the soil and the importance of setting up therein a correct N. P. balance, has to be assessed. The mode of absorption of phosphorus by the root hair of the cane crop has also to be studied. Long term manurial trials are to be laid out in the different soil climatic zones with a view to assessing on the one hand the effect of the cane, and on the other hand the overall effect of the different manurial forms on the physico-chemical properties of the soil. The potassic needs of sugarcane soils in the different States also need re-examination.

Very scanty information exists on the function of the soil micro-organism responsible for maintaining the fertility of the sugarcane soils at a high level. It appears desirable, therefore, that the sugarcane soils be examined carefully in respect of the changes brought about in the nitrogen fixing organisms by the addition of artificial fertilisers nitrogenous and phosphatic. The overall effect of the sugarcane soil micro-organisms in bringing about the various transformations of phosphorus in the soil, has also to be carefully assessed. In all further work related to the study of sugarcane soils, the presence or absence of the more important trace elements has to be determined and attempts are to be made to evaluate their function in improving the productivity of the soil.

(iii) *Cane Chemistry.*—Studies on the different nutritive organic and inorganic manures and their mixtures on the sucrose contents, development and cane yield under different climatic and soil conditions will be carried out in Bihar and U.P. The study of nutritional requirements of different sugarcane varieties with the help of chemical analysis of the plant to form a suitable manurial schedule is one of the main features of the programme. A comprehensive and detailed examination of the different tracts based on a suitable sampling technique with a view to work out a rational schedule of manuring and to study the influence of soil conditions on tonnage, quality and period of ripening of sugarcane have also been included in the programme of work.

Selection of different sugarcane varieties for different tracts, development criteria both physical and chemical for assessing juice character, colour, quality and taste of *gur* will be carried out at all the important research stations in the country.

Refractometer assessment of juice quality in standing crop having proved a very useful proposition, sampling procedure permitting of estimations within a similarly low error margin needs to be worked out. Use of 2, 4-D and other synthetic hormones, both as foilar and soil treatment as a means of improving sugar content in the crop has also to be extensively investigated on a large scale by actual milling tests so as to obtain reliable estimates of responses of a small magnitude.

The problem of minimising sugar losses during the time lag between harvest and milling is one of great importance to the industry. Mist spraying of harvested cane has enabled these losses to be cut down in a remarkable measure and any attempts to develop more effective methods would prove highly profitable.

(iv) *Cane Entomology.*—The programme for the control of sugarcane pests in different sugarcane growing areas is based on the incidence and degree of damage done to the standing crop by a particular pest. The main sugarcane pests in U.P., Bihar and Punjab and other States are the borer, pyrilla and white fly. It is proposed to study these pests at different stages of growth and on the maturity of the crop with a view to ascertain the incidence of the pests and the loss in tonnage and recoverable sucrose. Different preventive and control measures are also to be studied. The detailed programme of Insect Pests Schemes, as approved by the Indian Central Sugarcane Committee in the States of U.P., Bihar, Punjab, Bombay, West Bengal, Hyderabad, Andhra and Madras is given below :—

Item No. I — Influence of individual weather conditions like cloudiness, rains and humidity etc., on the incidence and population of the pests (All Centres).

Item No. II — Influence of general climatic conditions on the population of borers, *Pyrilla*, termites and white fly (All Centres).

Item No. III — Influence of microclimatic factors in crops when such factors differ as a result of varietal features (for U. P., Bihar and Madras only).

Item No. IV — Filling in gaps in our knowledge of the biology of sugarcane pests (All Centres).

Item No. V — Biology and control of termites in sugarcane (All Centres except Bombay).

Item No. VI — Chemical control of sugarcane borers, *Pyrilla* white fly and lygaeid bug, etc.

Item No. VII — Study of major pests of Sugarcane under controlled conditions (Bihar only).

Item No. VIII — Pot experiments to determine the effects of sap concentration on the incidence of *Pyrilla* (Bihar only).

Item No. IX — Survey of sugarcane pests (All Centres).

The biology of promising parasites (indigenous and foreign) has also to be studied with special reference to their utilisation on a field scale in the control of various sugarcane pests under Indian conditions. The main lines of endeavour in furtherence of devising effective control measures against the different pests would consist of toxicological evaluation of modern insecticides, on soil microflors, persistence of different formulations under different weather conditions, efficiency and economics of plant protection equipment of various kinds, besides work on biological control with special reference to establishment of exotic parasites, improved mass breeding technique and use of fungal parasites in combating the various sugarcane pests.

(v) *Cane Mycology.*—The diseases of common occurence *i.e.*, Red-Rot smut, etc., which cause considerable damage to the standing crop and their possible control with the existing knowledge will be undertaken at almost all Research Stations. Work on these diseases is being mostly confined to those of economic importance. The problems of fundamental nature are proposed to be undertaken under the Scheme of Sugarcane Diseases at the Indian Agricultural Research Institute, New Delhi. In their technical programme they have included studies on physiological forms of Red-rot fungus besides testing improved cane varieties for resistance to different virulent isolates of *C. falcatum* when taken individually or as mixed inocula. The investigation of those problems is very important in estimating loss in yield and sugar at various percentages of incidence. Wilt and top-rot are two other fungus diseases which cause considerable damage to sugarcane crop. Regarding wilt disease, the Committee proposes to carry out investigations and its control at the Sugarcane Research Station, Pusa (Bihar). As regards top rot, the reproduction of the disease under artificial conditions has yet to be accomplished.

Another disease which has recently acquired international importance is "ratoon stunting disease". Its presence or absence has to be established by elaborate experimentation and if the latter is the case, a careful watch to prevent its introduction into the country is very essential. In the case of the former, adequate steps have to be taken so that it does not spread to healthy zones and is also eliminated from diseased crops.

The appearance of new virus disease or diseases of suspected virus origin like "leafy tuft" and "twisted top" should engage the urgent attention of plant pathologists as these diseases appear to be spreading rapidly and may soon assume proportions of a menace.

Gur Research.—55 to 60 per cent of the total production of sugarcane in the country is utilised for the manufacture of *gur*. *Gur* as a food is valued in many parts of suitable crushers, suitable clarificants, economic types of *bels* and furnaces and finally suitable types of storing arrangements. The programme for work for the succeeding years includes, besides the studies dealing with effecting further improvements in the manufacturing technique of *gur*, work on cane varieties and their relationship with *gur* and changes in *gur* composition during storage under different conditions etc. The object of further investigations is to establish criteria for grading *gur* and also establishing schedules which would help in producing *gur* of more presentable form. Practically all the Sugarcane Research Stations are carrying out *gur* investigations in one form or another.

General.—Continuous research in sugarcane agriculture conducted at the various Centres and Sugarcane Research Stations and Sub-Stations ever since the formation of the Indian Council of Agricultural Research and later the establishment of the Indian Central Sugarcane Committee, has played an important role in the development of the Sugarcane Industry in India. The value of research cannot be under estimated and it should continue to be carried on with increased fervour. There is seldom any finalit research and particularly in the research connected with biolog organisms, which are always liable to change in their behaviour to changes in environment. This has been well substantiated the changes observed in the casual organisms like fungus flora Red-rot and also in the varieties which were once accepted as sistant to particular diseases but have now started exhibiting ceptibility.

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